

TEKTRONIX®

5A48

DUAL TRACE

AMPLIFIER

INSTRUCTION MANUAL



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OPERATING INSTRUCTIONS

INSTRUMENT DESCRIPTION

The 5A48 Dual-Trace Amplifier is a general purpose, medium bandwidth, plug-in unit for use with Tektronix 5400-series oscilloscopes. The unit contains two independent amplifier channels with identical characteristics. The channels may be used for single channel displays, combined for algebraically added displays, or electronically switched to produce simultaneous dual-trace displays. Provision for inversion of Channel 2 signals permits differential displays. Illuminated VOLTS/DIV knob skirts directly indicate deflection sensitivities. The plug-in has

readout encoding capabilities. When used in an oscilloscope with readout capabilities, the deflection sensitivities are displayed on the CRT. When used with Tektronix probes with readout capabilities, the plug-in indicates the decreased deflection sensitivity on the knob skirt, as well as on the CRT. When operating in the two most sensitive positions, the reduced bandwidth is visible through the VOLTS/DIV knob skirt. The plug-in is designed as a vertical amplifier, but may be used in the horizontal compartment for certain X-Y displays.

PREPARATION FOR USE

Your 5A48 is calibrated and ready for use when received. Fig. 1-1 shows installation-removal procedure. The 5A48 will operate in the horizontal compartment of the Power Supply/Amplifier module. When using X-Y dis-

plays, remember that the vertical channel is delayed approximately 150 nanoseconds (3° phase shift at 50 kHz) by the vertical delay line. Refer to the Front Panel Controls & Connectors illustration on the Controls & Connectors

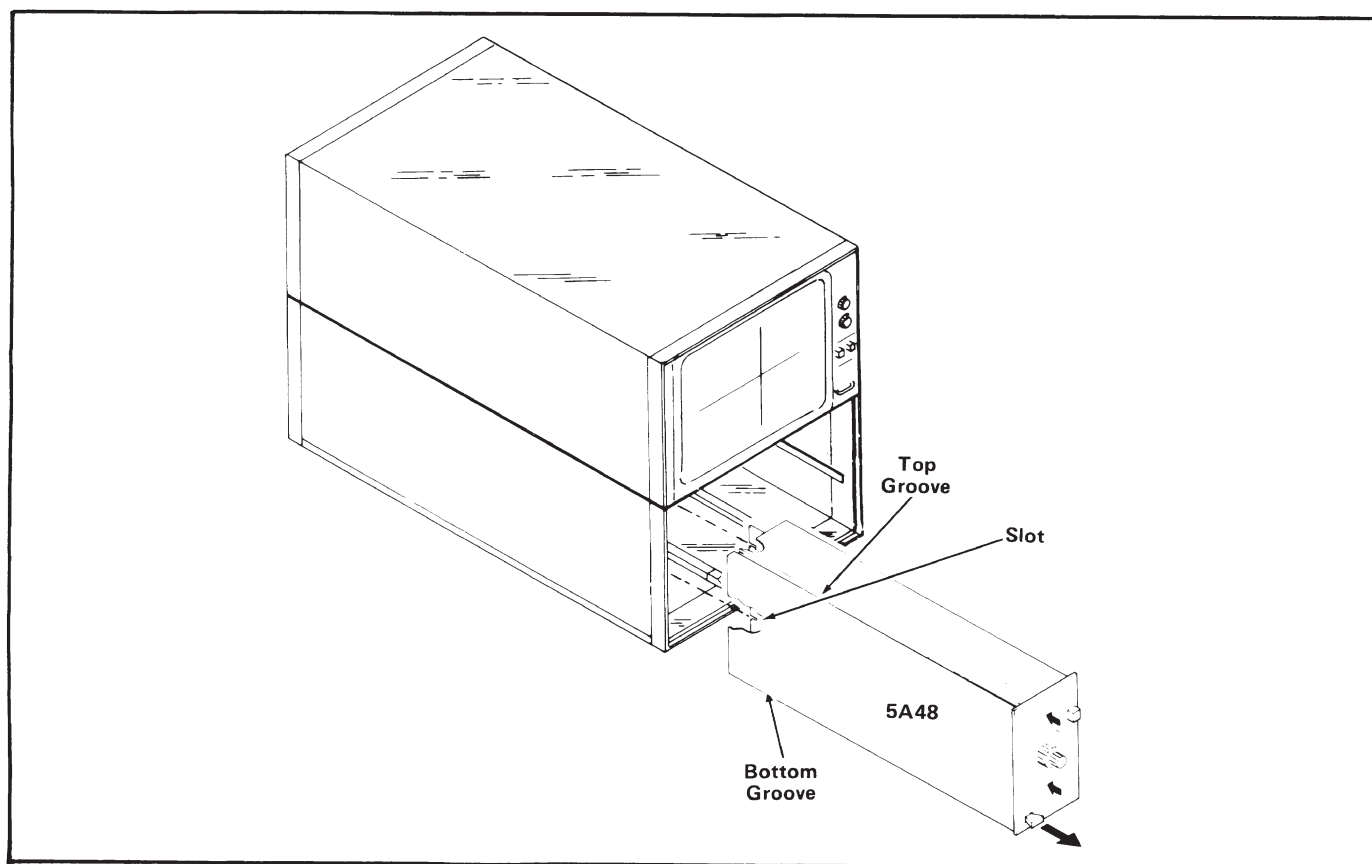


Fig. 1-1. 5A48 Installation-Removal Procedure.

Operating Instructions—5A48

fold out page for a description of the front panel. Notice the color patterns printed on the front panel. Blue indicates mode switching functions, green refers to triggering, yellow is precautionary and grey shows functional associations.

When the VOLTS/DIV switches are in the 1 mV or 2 mV positions, the bandwidth reduction to 25 MHz is visible as a reminder on a yellow background through the knob skirts.

BASIC OPERATION

Push both the DISPLAY ON button and the CH 1 MODE button (in the blue area). Set the time base to 2 m and the sweep trigger to automatic. Notice the illuminated skirt on the CH 1 VOLTS/DIV switch showing vertical sensitivity. Set the display module intensity control to midrange. Turn the 5A48 POSITION control until a trace appears on the CRT. Push the CH 1 and CH 2 MODE buttons. The CH 2 switch is now illuminated, showing its sensitivity. Both CH 1 and CH 2 buttons should now be in. Turn the lower POSITION knob until two traces are visible on the CRT. Set both VOLTS/DIV switches to .2. Push the CH 1 TRIGGER button, located in the green area. Make certain that the AC and GND buttons for both channels, in the grey area, are out.

Apply the calibrator signal to the input connectors on both channels. Adjust the triggering on the time base for

two stable square-wave displays, each approximately two divisions in amplitude. Push the ADD button and observe a square wave four divisions in amplitude. Now push the CH 2 INVERT button and observe a single trace. When the 5A48 is in the ADD MODE, either POSITION control positions the trace; however, when using this mode, center one position control and use the other to position the trace. Release the CH 2 INVERT button, and push the CH 1 MODE button. Push the channel 1 GND button and position the single trace to the graticule center. Release the GND button and push the AC button directly above it. Notice that the square wave centers around the graticule center and shows a slight slope. This indicates that the signal is capacitively coupled to the input. The slope indicates low frequency rolloff due to the AC coupling. Channel 2 input characteristics are identical. If any of the above displays cannot be obtained refer to the Service Section of this manual.

GENERAL OPERATING INFORMATION

Applying Signals

When making measurements of unknown voltages, use the highest deflection factor first. If the deflection is too small, switch to a lower deflection factor. In general, probes offer the most convenient method of applying signals to the 5A48. Tektronix probes are shielded to prevent pickup of electrostatic interference. A 10X probe offers a relatively high input impedance and minimum loading to the circuit under test. The 5A48 is compatible with readout coded probes, such as the P6065 passive probe. Your Tektronix catalog lists other probes compatible with the 5A48. The input connector has an outer ring to which the coding ring on the probe connector makes contact. This allows the deflection factor (indicated on the knob skirt and the CRT readout) to correspond with the actual deflection factor at the probe tip. Notice the notation WITH PROBE on the front panel.

Sometimes unshielded test leads can be used to connect the 5A48 to a signal source. This method works best when measuring high-level signals with relatively low source impedances. Coaxial cable with BNC connectors works well in certain applications. When using unterminated coaxial cable use the shortest possible lengths to prevent unnecessary capacitive loading of the signal source. A common ground between the signal source and 5A48 is required. The probe ground connection or the shield of a coaxial cable works well as a ground return.

Input Coupling

DC coupling (button out) can be used in most applications. If the DC component of the measured signal is large compared to the AC component, AC coupling (button in)

should be used. Use DC coupling for AC signals below about 10 hertz, to avoid signal attenuation in the AC position.

The GND pushbutton provides a ground reference at the 5A48 input. When the pushbutton is in, the amplifier input is grounded, and the signal is connected to ground through a 1 M Ω resistor. Obtain a ground reference by pushing this button.

Pre-Charging

Use of this feature prevents surge currents, due to charging the AC coupling capacitor, from damaging the circuits under test (see Fig. 1-2). When using deflection factors of 20 mV/Div through 1 mV/Div with a test lead or 1X probe, push both the AC and GND pushbuttons. Connect the 5A48 input to the circuit under test and wait about one second to allow the coupling capacitor to charge to the DC input voltage. Release the GND button and the AC signal is now visible on-screen.

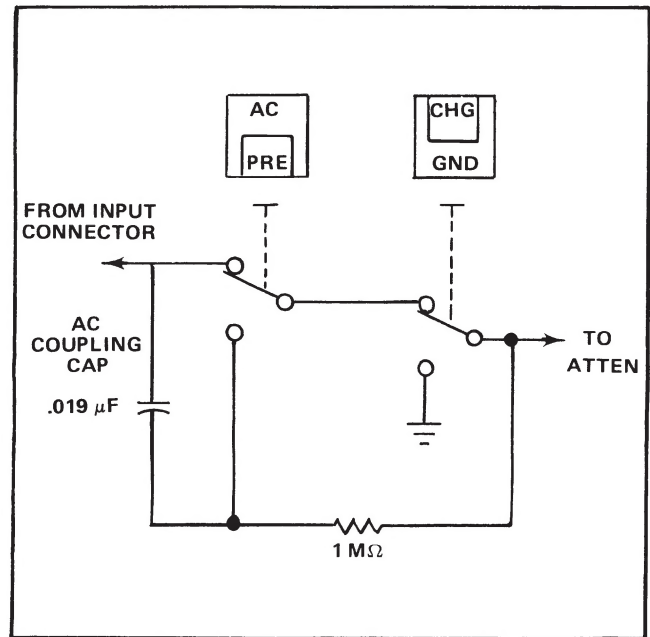


Fig. 1-2. Pre-Charging Circuit

SPECIFICATIONS

All references to divisions or VOLTS/DIV refer to major graticule divisions in this manual.

BANDWIDTH: In the 5403, 6 div reference signal, DC coupled, 1 mV/DIV and 2 mV/DIV ≥ 25 MHz; 5 mV/DIV through 10 V/DIV, ≥ 60 MHz. Lower end response AC coupled, ≤ 10 Hz (≤ 1.0 Hz with 10X probe) at all deflection factors.

RISETIME: ≤ 14 ns, 1 mV/DIV and 2 mV/DIV. ≤ 5.8 ns, 5 mV/DIV through 10 V/DIV.

DEFLECTION FACTOR ACCURACY: $\leq 5\%$ at 1 mV/DIV and 2 mV/DIV, $\leq 3\%$ from 5 mV/DIV to 10 V/DIV from 15°C to 35°C, $\leq 4\%$ from 5 mV/DIV to 10 V/DIV from 0°C to 50°C. A continuously variable control provides $\leq 2.5X$ additional attenuation on each range.

ABERRATIONS: $\pm 2\%$, of total 3% of displayed step amplitude.

COMMON MODE REJECTION RATIO: $\geq 50:1$ from 5 V/DIV to 10 V/DIV, up to 1 MHz.

$\geq 20:1$ at 1 mV/DIV to 2 mV/DIV, up to 1 MHz.

CHANNEL ISOLATION: $\geq 50:1$, to 60 MHz, with both traces displayed.

STABILITY: ≤ 0.3 mV vertical shift in any one minute after one hour warmup, ambient temperature and line

voltage held constant. ≤ 0.2 mV/°C vertical shift with line voltage held constant.

INPUT RESISTANCE AND CAPACITANCE: Input 1 M Ω within 0.5%, shunted by approximately 24 pF.

MAXIMUM SAFE INPUT VOLTAGE: DC coupled: 250 V (DC + Peak AC), AC component 500 V peak to peak maximum, 1 kHz or less. AC coupled: 500 V (DC + Peak AC), AC component 500 V peak to peak maximum, 1 kHz or less.

TEMPERATURE RANGE: 0°C to +50°C operating, -40°C to +70°C nonoperating.

ALTITUDE RANGE: $\leq 15,000$ feet operating, $\leq 50,000$ feet nonoperating.

DIMENSIONS: 5.0 in (12.5 cm) H. 2.6 in (6.7 cm) W. 12.0 in (30.5 cm) L.

WEIGHT: ≈ 2 lbs. (0.9 kg).

SUPPLEMENTAL INFORMATION

DISPLAYED NOISE: $\leq 300 \mu V$ at 5 mV/DIV tangentially measured in a 5400 series mainframe.

STEP ATTENUATOR BALANCE: ≤ 1 division vertical trace movement as VOLTS/DIV switch is rotated through its range.

INVERT SHIFT: ≤ 3 divisions vertical trace shift when CH 2 INVERT button is pushed in.

POSITION RANGE: ± 7 divisions from graticule center.

SIGNAL DELAY BETWEEN CHANNELS: ≤ 700 ps.

THEORY OF OPERATION

Introduction

Refer to the complete schematic diagrams and the block diagram located in the pullout pages at the back of this manual. As both channels are nearly identical, only channel 1 will be discussed in detail.

Input Coupling

Signals applied to the front panel BNC connectors pass to the attenuators through the precharge circuitry. This allows charging or discharging AC coupling capacitor C101 to prevent damage to delicate circuitry under test. The outer ring on the BNC connector is connected to the base of Q105, which operates the WITH 10X PROBE light behind the CH 1 VOLTS/DIV switch skirt. The ring also connects to Q610, which operates the readout circuitry. Another front-panel light, controlled by Q110 illuminates unless a 10X coding probe is connected. These lights operate only when connected to +200 V through S480A, the CH 1 MODE switch.

Attenuators

The attenuators are AC-compensated thick film hybrids on ceramic substrates. C114 sets the proper input capacitance, and C116 provides the proper series compensation for the 100X chip. C124 and C126 provide identical functions for the 10X attenuator chip. C134 compensates the input to 24 pF in the 1X position. The combination of these attenuators, switched according to the charts shown on the schematics, attenuate the signals to the 5A48 amplifiers.

Channel 1 Amplifier

The attenuated signal is fed to FET Q140A, paired with Q140B. R145, through Q140B, sets DC balance for the amplifier. The signal is taken from the source of Q140A past protective diode CR140 to the base of Q150. The signal at the emitter of Q150 follows the signal at the gate of Q140A. A divider string consisting of R159, R161, R163, and R164 provides attenuation to Q170. Attenuation is 1X when R158 is connected, 2X through R161, and 4X through R164. The gain of Q150 and Q155 does not change, only the signal driving Q170 is attenuated. See Fig. 2-1 for a simplified diagram of the attenuation circuit.

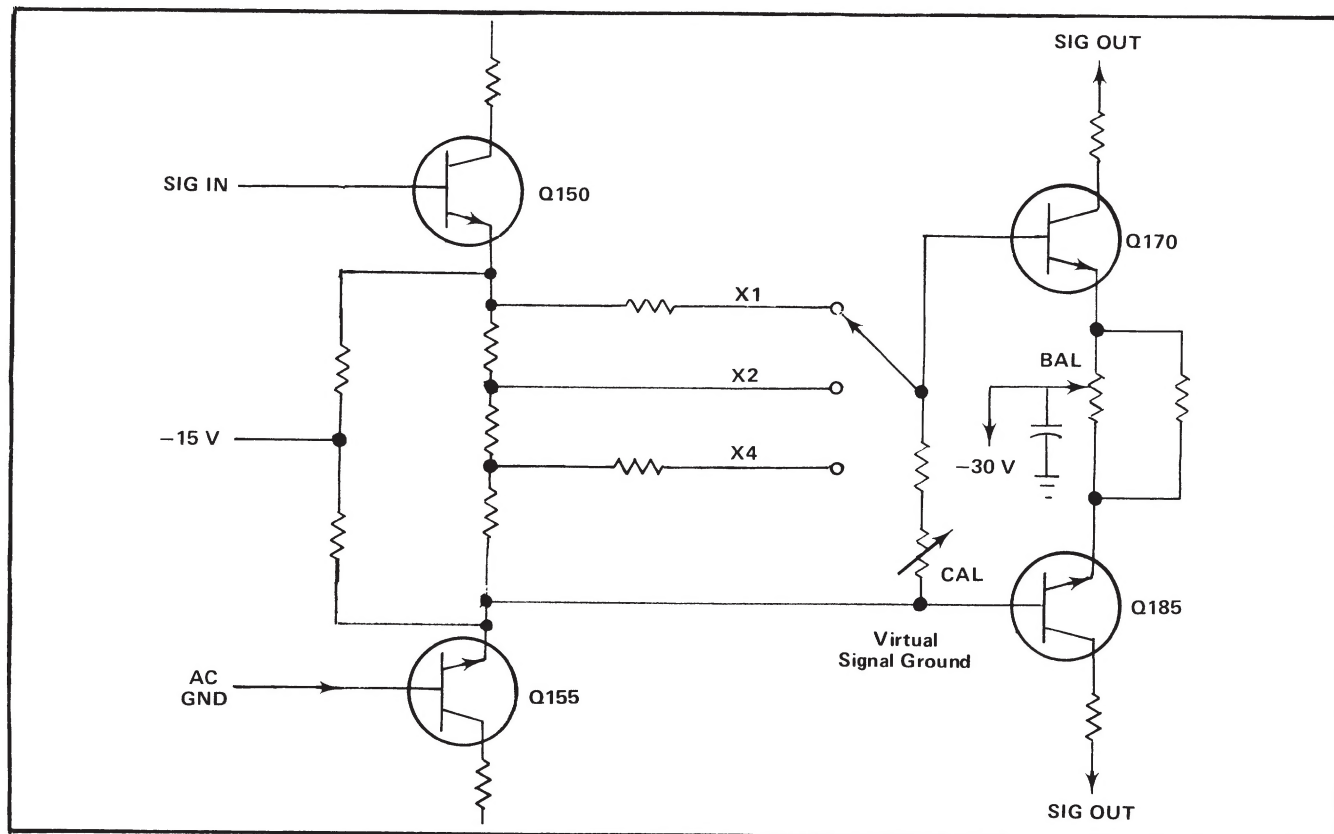


Fig. 2-1. Simplified diagram of attenuation and single ended to paraphase transition.

Theory of Operation—5A48

R152 sets the correct DC operating point for Q150 and Q155. Q170 and Q185 form a paraphase amplifier. Their collectors drive Q172 and Q187, which are current driven to reduce Miller effect. RT178 changes resistance, and consequently the gain of Q170 and Q185 so that the gain remains constant with changes in temperature. Q170 and Q185 provide a gain of about 3. R189 is switched out of the circuit by K190 to increase the gain to 15 in the two most sensitive positions. CR190 and CR210 are protective diodes.

Q190 and Q210 provide additional amplification. C199 affects high frequency gain. These transistors current drive Q195 and Q215 to reduce Miller effect and thereby improve high frequency response. The output of Q195 and Q215 drives the bases of Q240 and Q250 across load resistors common to both channels, R230 and R235. Their emitters drive the vertical amplifier in the main frame through the rear interface connector. Trace positioning is accomplished by changing the current division between Q195 and Q215 through the position control, R225, and constant current source Q220. Trigger signals are taken from the emitters of Q190 and Q210, amplified by Q260 and Q265 and passed to the trigger switch. Channel 1 is turned off by bringing the bases of Q195 and Q215 positive through R217. Q230 and Q235 are turned on through R232, shorting any signal through their common collectors. They also replace the current drawn by Q195 and Q215 through R195 and R215, respectively, keeping the DC operating conditions stable. Channel 2 signals are applied at the collectors of Q195 and Q215.

Channel 2 Amplifier

The circuit description for channel 1 describes the operation of channel 2 with minor exceptions. S390 inverts the output of channel 2 by cross switching the signals. Q395 and Q415 perform the same function as Q195 and Q215. Q430 and Q435 are functionally identical with Q230 and Q235.

Channel Switch

A signal (0 to 4 V) from the main frame is present at pin 21 of the rear interface connector. This signal is timed by the start of the sweep (alternate mode) or by a free-running multivibrator (chopped mode). CR490 and CR491 limit the

excursions of this signal. In the DUAL TRACE mode, the signal is connected to the base of Q485, whose emitter is connected to the emitter of Q480. Their collectors are connected to the vertical channels, which are alternately turned on and off as previously described. Q480 enables channel 2 and Q485 channel 1 by connecting their emitters to -15 V through the MODE switches. In the ADD mode, both channels are enabled to sum their signals across their common load resistors. Additional contacts on the CH 1 and CH 2 switches give information to the main frame channel switch and provide power to the lights behind the VOLTS/DIV switch skirts.

Trigger Amplifier

The paraphase trigger signal from the vertical channels is applied to the emitters of Q270 and Q275. Only one channel trigger is used at any one time; the other is shorted. When both CH 1 and CH 2 TRIGGER switches are out, Q272 turns on and sinks the collector current from both vertical channel trigger amplifiers, maintaining stable DC levels throughout the circuit. The active channel trigger is amplified by Q270 and Q275 which drive Q280 and Q290. Q290 drives Q292, whose output is sent to the horizontal plug-in through the rear interface connector. Q280 drives Q285, an additional stage for phase inversion. Its output is combined with the output of Q292 through R296. The circuit provides single-ended output for differentially applied signals, thus a high degree of cancellation of common mode signals.

Readout

The DISPLAY, CH 1 and CH 2 MODE, CAL, CH 2 INVERT, and VOLTS/DIV switches have contacts wired into the readout circuitry. A 0 V to -15 V pulse approximately $125\text{ }\mu\text{s}$ in length is applied at different times to all of the rear interface connectors associated with the readout circuitry, except the 2 column and row lines. These are the output lines. The readout circuitry in the 5A48 allows the correct amount of current to the appropriate channel row and column lines during the pulse time for the particular character desired. See the main frame manual for more details on the particular time slot and currents required for each character. Q610 and Q630 apply the correct readout currents for the attenuation of the probe used.

Test Equipment

For calibration, and a complete accuracy check of the 5A48, the following equipment is required:

Tektronix 5403 Oscilloscope

Tektronix 5B42 or equivalent Time Base

Tektronix Type 106 Square-Wave Generator or equivalent

Tektronix Standard Amplitude Calibrator, 067-0502-00 or equivalent

Tektronix 24 pF Input Normalizer, 067-0539-00

50 Ω BNC Termination, 011-0049-01

50 Ω 5X BNC Attenuator, 011-0060-01

50 Ω Coaxial Cable, 012-0057-01

Voltmeter $\geq 20,000 \Omega/V$, Tektronix DM 501 or equivalent.

Preparation

This instrument should be adjusted at an ambient temperature between +25°C and +30°C (+68°F and +86°F) for best accuracy. Remove the left side plug-in cover and install the 5A48 in the center plug-in compartment of the 5400 series oscilloscope.

1. 5B42 Presets

POSITION	midrange
MAIN SEC/DIV	1 m
MAIN TRIG LEVEL	cw
AUTO TRIG	in
SOURCE + SLOPE	in
SOURCE RIGHT	in
MAIN SWP MODE	in
All other 5B42 pushbuttons must be out.	

2. 5A48 Presets

CH 1 and CH 2 VOLTS/DIV	10 m
CH 1 and CH 2 CAL	cw (detent)
CH 1 and CH 2 POSITION	midrange
DISPLAY	in
CH 1 and CH 2 MODE (DUAL TRACE)	in
CH 1 TRIGGER	in
CH 1 and CH 2 GND	in
All other 5A48 pushbuttons must be out.	

3. Adjust DC Levels

Connect the positive lead of the DC Voltmeter to TP1 and the negative lead to TP2. Adjust R 152 for a reading of 7.5 volts on the voltmeter. Connect the positive lead of the DC voltmeter to TP3 and the negative lead to TP4. Adjust R352 for a reading of 7.5 volts on the voltmeter.

4. Adjust DC Balance

Position both traces to graticule center with the POSITION controls. Set CH 1 and CH 2 VOLTS/DIV to position 1 m. Reposition both traces to graticule center by adjusting the front panel STEP ATTEN BAL controls. Now adjust the front panel STEP ATTEN BAL controls for no trace shift while switching the VOLTS/DIV switches between the 2 m and 1 m positions. Adjust R182, BAL, for no trace shift while switching CH 1 VOLTS/DIV switch between positions 5 m and 2 m. Adjust R382, BAL, for no trace shift while switching CH 2 VOLTS/DIV switch between positions 5 m and 2 m. Return the CH 2 trace to graticule center with the CH 2 POSITION control. Push the CH 2 INVERT button and check that the CH 2 trace shifts less than 3 major divisions. Release the CH 2 INVERT button.

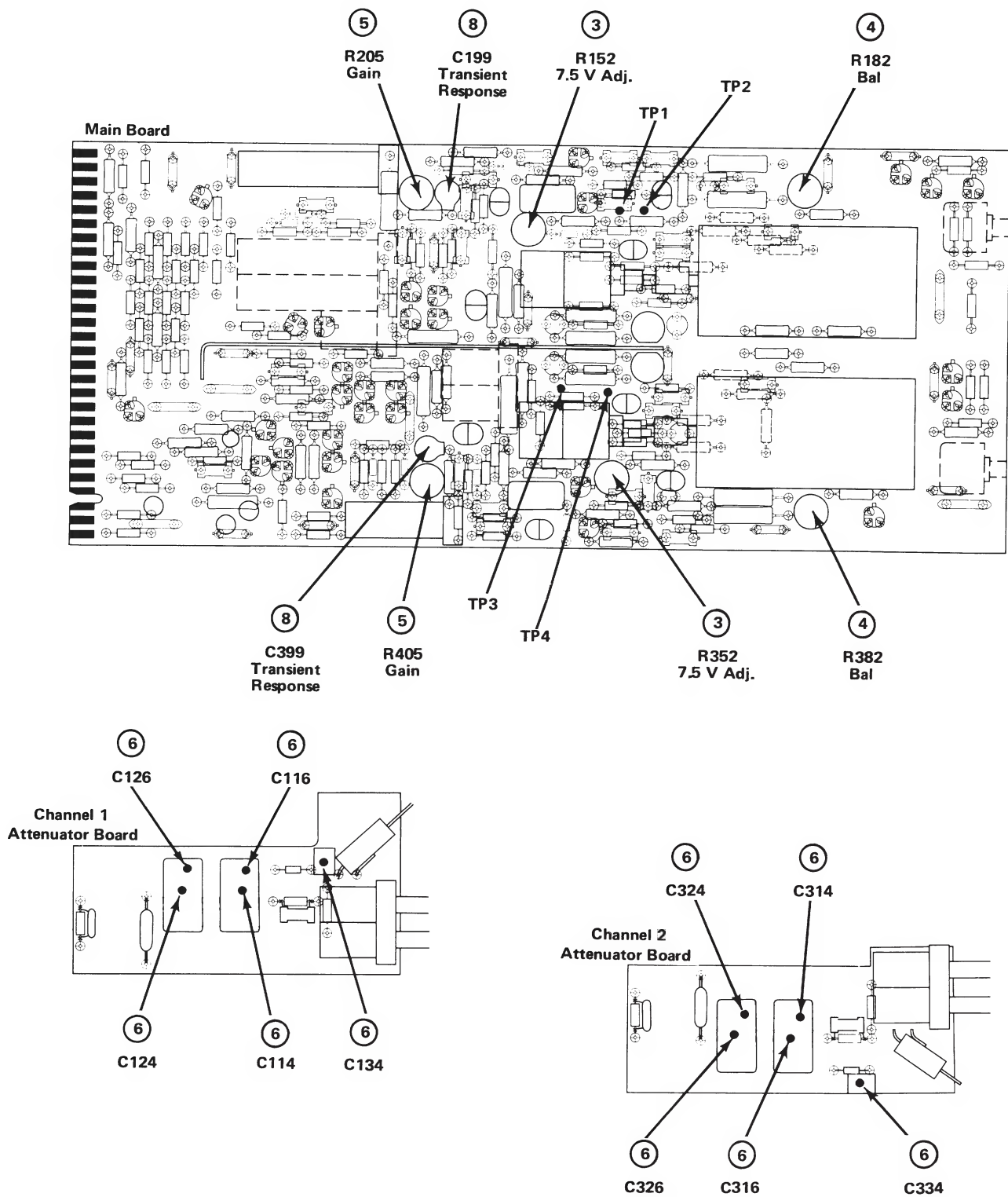
5. Adjust Gain

Set the CH 1 and CH 2 VOLTS/DIV switch to position 10 m. Make certain the DISPLAY, CH 1 MODE, CH 1 TRIGGER, and CH 2 GND pushbuttons are in. All other pushbuttons must be out. Connect the Standard Amplitude Calibrator output set for 50 mV through the BNC coaxial cable to the CH 1 input connector. Adjust the 5B42 MAIN TRIG LEVEL for a stable display. Adjust R205 for exactly 5 major divisions of display. Now push the CH 1 GND, CH 2 MODE, and CH 2 TRIGGER buttons. Release all other buttons except the DISPLAY button. Connect the coaxial cable to the CH 2 input. Adjust R405 for exactly 5 major divisions of display.

6. Adjust Input Capacitance and Compensate Attenuator

The DISPLAY, CH 2 MODE, CH 1 GND, and CH 2 TRIGGER must be depressed. Set both CH 1 and CH 2 VOLTS/DIV switches to the 20 m position. All other pushbuttons must be out. Connect the HI AMPLITUDE OUTPUT of the Type 106 through a 50 Ω cable, 5X attenuator, 50 Ω termination, and the 24 pF Normalizer in that order to the CH 2 input. Set the square-wave generator to a frequency of 1 kHz and adjust its amplitude for a display of 5 major divisions. Proceed to part A in Table 3-1

INTERNAL ADJUSTMENT PROCEDURE



and perform the adjustments as indicated, adjusting the square-wave generator to an amplitude of 5 major divisions for each position of the VOLTS/DIV switch. After completing part A, repeat the above procedure for CH 1 following the instructions in part B of Table 3-1. The square-wave level, rolloff, or overshoot must not exceed 0.1 major division in any positions of either VOLTS/DIV switch.

TABLE 3-1

Part A			Part B		
CH 2 VOLTS/ DIV	Adjust Level	Adjust Front Corner	CH 1 VOLTS/ DIV	Adjust Level	Adjust Front Corner
20 m	C334	----	20 m	C134	----
50 m	C324	C326	50 m	C124	C126
.1	Check front corner		.1	Check front corner	
.2	Check front corner		.2	Check front corner	
Remove 5X Attenuator					
.5	C314	C316	.5	C114	C116
1	Check front corner		1	Check front corner	
2	Check front corner		2	Check front corner	
5	Check front corner		5	Check front corner	
10	Check front corner		10	Check front corner	

7. Check VOLTS/DIV Accuracy

Make certain the DISPLAY, CH 1 MODE and CH 1 TRIGGER pushbuttons are in. Release all other pushbuttons. Set the CH 1 and CH 2 VOLTS/DIV switch to the 1 m position. Set the Standard Amplitude Calibrator to the 5 mV position, and connect it to the CH 1 input with the 50 Ω BNC cable. Check the CH 1 attenuator according to Table 3-2, noting the maximum error. Reconnect the Standard Amplitude Calibrator to CH 2, obtain a display with CH 2 by pressing the CH 2 MODE and CH 2 TRIGGER buttons. Release the buttons for CH 1. Repeat the above procedure for CH 2 using Table 3-2 as a guide.

TABLE 3-2

SAC AMPLITUDE	5A48 VOLTS/DIV	Display Amplitude	Max Error
5 mV	1 m	5 div	.25 div (5%)
10 mV	2 m	5 div	.25 div (5%)
20 mV	5 m	4 div	.12 div (3%)
50 mV	10 m	5 div	.15 div (3%)
.1 V	20 m	5 div	.15 div (3%)
.2 V	50 m	4 div	.12 div (3%)
.5 V	.1 m	5 div	.15 div (3%)
1 V	.2 m	5 div	.15 div (3%)
2 V	.5 m	4 div	.12 div (3%)
5 V	1 m	5 div	.15 div (3%)
10 V	2 m	5 div	.15 div (3%)
20 V	5 m	4 div	.12 div (3%)
50 V	10 m	5 div	.15 div (3%)

8. Adjust Transient Response

Push the DISPLAY, CH 1 MODE, CH 2 GND, and the CH 1 TRIGGER pushbuttons. Release all other buttons. Set the CH 1 VOLTS/DIV switch to 10 m. Connect the + output of the Type 106 Square-Wave Generator through a 50 Ω BNC cable and a 50 Ω termination to the CH 1 input. Set the Type 106 for a frequency of 500 kHz and adjust for a 5 division display. Set the 5B42 MAIN SEC/DIV to .1 μ . Adjust the 5B42 triggering for a stable display. Center the display using the 5A42 and 5A48 POSITION controls. Adjust C199 for the best square corner on the waveform. Repeat the above procedure, substituting CH 2 for CH 1, and adjust C399 for the best square corner on the waveform.

DIAGRAMS, PARTS LISTS, AND ILLUSTRATIONS

Symbols and Reference Designators

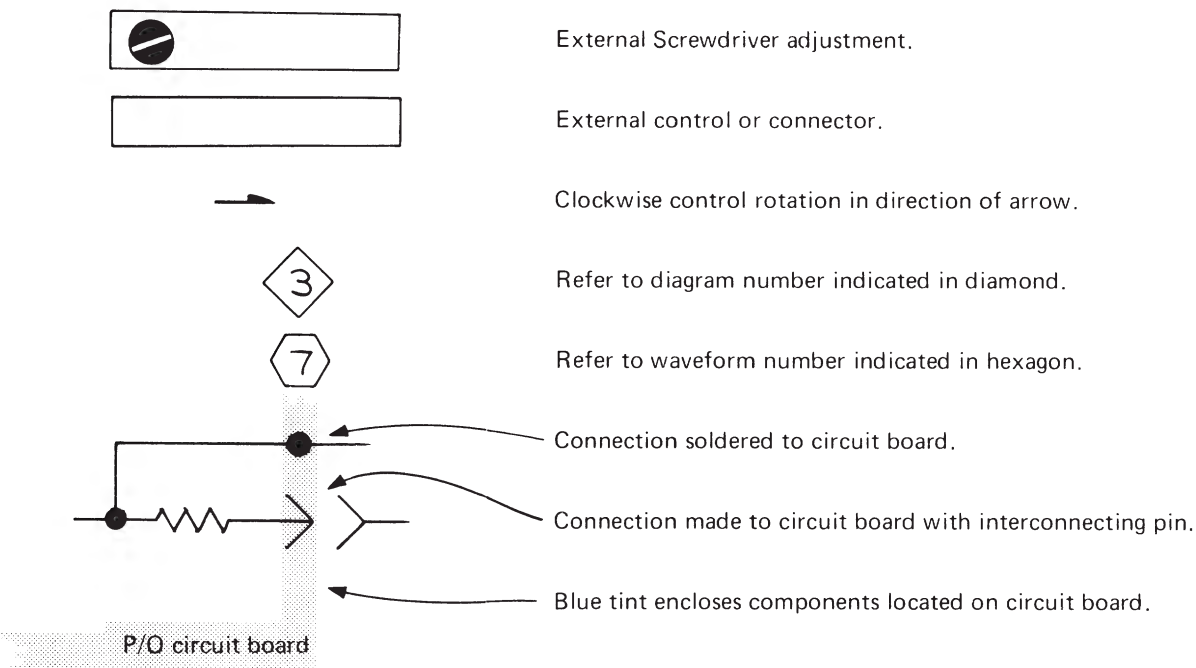
Electrical components shown on the diagrams are in the following units unless noted otherwise:

- Capacitors = Values one or greater are in picofarads (pF).
Values less than one are in microfarads (μF).
- Resistors = Ohms (Ω)

Symbols used on the diagrams are based on ANSI Y32.2 – 1970.

Logic symbology is based on MIL-STD-806B in terms of positive logic. Logic symbols depict the logic function performed and may differ from the manufacturer's data.

The following special symbols are used on the diagrams:



REPLACEABLE ELECTRICAL PARTS

PARTS ORDERING INFORMATION

Replacement parts are available from or through your local Tektronix, Inc. Field Office or representative.

Changes to Tektronix instruments are sometimes made to accommodate improved components as they become available, and to give you the benefit of the latest circuit improvements developed in our engineering department. It is therefore important, when ordering parts, to include the following information in your order: Part number, instrument type or number, serial number, and modification number if applicable.

If a part you have ordered has been replaced with a new or improved part, your local Tektronix, Inc. Field Office or representative will contact you concerning any change in part number.

Change information, if any, is located at the rear of this manual.

SPECIAL NOTES AND SYMBOLS

X000 Part first added at this serial number
00X Part removed after this serial number

ITEM NAME

In the Parts List, an Item Name is separated from the description by a colon (:). Because of space limitations, an Item Name may sometimes appear as incomplete. For further Item Name identification, the U.S. Federal Cataloging Handbook H6-1 can be utilized where possible.

ABBREVIATIONS

ACTR	ACTUATOR	PLSTC	PLASTIC
ASSY	ASSEMBLY	QTZ	QUARTZ
CAP	CAPACITOR	RECP	RECEPTACLE
CER	CERAMIC	RES	RESISTOR
CKT	CIRCUIT	RF	RADIO FREQUENCY
COMP	COMPOSITION	SEL	SELECTED
CONN	CONNECTOR	SEMICON	SEMICONDUCTOR
ELCTLT	ELECTROLYTIC	SENS	SENSITIVE
ELEC	ELECTRICAL	VAR	VARIABLE
INCAND	INCANDESCENT	WW	WIREWOUND
LED	LIGHT EMITTING DIODE	XFMR	TRANSFORMER
NONWIR	NON WIREWOUND	XTAL	CRYSTAL

Electrical Parts List—5A48

CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
01121	Allen-Bradley Co.	1201 2nd St. South	Milwaukee, WI 53204
03508	General Electric Co., Semi-Conductor Products Dept.	Electronics Park	Syracuse, NY 13201
07263	Fairchild Semiconductor, A Div. of Fairchild Camera and Instrument Corp.	464 Ellis St.	Mountain View, CA 94042
07910	Teledyne Semiconductor	12515 Chadron Ave.	Hawthorne, CA 90250
08806	General Electric Co., Miniature Lamp Products Dept.	Nela Pk.	Cleveland, OH 44112
13715	Fairchild Semiconductor, A Div. of Fairchild Camera and Instrument Corp.	4300 Redwood Hwy.	San Rafael, CA 94903
17856	Siliconix, Inc.	2201 Laurelwood Rd.	Santa Clara, CA 95054
24931	Specialty Connector Co., Inc.	3560 Madison Ave.	Indianapolis, IN 46227
34553	Amperex Electronic Corp., Component Div.	35 Hoffman Ave.	Happauge, NY 11787
50157	N. L. Industries, Inc., Electronics Dept.	P. O. Box 787	Muskegon, MI 49443
56289	Sprague Electric Co.		North Adams, MA 01247
71590	Centralab Electronics, Div. of Globe-Union, Inc.	5757 N. Green Bay Ave.	Milwaukee, WI 53201
72982	Erie Technological Products, Inc.	644 W. 12th St.	Erie, PA 16512
73138	Beckman Instruments, Inc., Helipot Div.	2500 Harbor Blvd.	Fullerton, CA 92634
74970	Johnson, E. F., Co.	299 10th Ave. S. W.	Waseca, MN 56093
75042	TRW Electronic Components, IRC Fixed Resistors, Philadelphia Division	401 N. Broad St.	Philadelphia, PA 19108
78488	Stackpole Carbon Co.		St. Marys, PA 15857
80009	Tektronix, Inc.	P. O. Box 500	Beaverton, OR 97077
90201	Mallory Capacitor Co., Div. of P. R. Mallory Co., Inc.	3029 E. Washington St.	Indianapolis, IN 46206
91637	Dale Electronics, Inc.	P. O. Box 609	Columbus, NB 68601
97979	Reon Resistor Corp.	63 Lincoln Hwy.	Fraser, PA 19355

Electrical Parts List—5A48

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
A1	670-2068-00			CKT BOARD ASSY:MAIN	80009	670-2068-00
A2	670-2574-00			CKT BOARD ASSY:CH2 ATTENUATOR	80009	670-2574-00
A3	670-2575-00			CKT BOARD ASSY:CH1 ATTENUATOR	80009	670-2575-00
C100	283-0005-00			CAP.,FXD,CER DI:0.01UF,+100-0%,250V	72982	8131-250651103P
C101	285-0816-04			CAP.,FXD,PLSTC:0.19UF,10%,600V		
C102	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C112	281-0572-00			CAP.,FXD,CER DI:6.8PF,+/-0.5PF,500V	72982	301-000C0H0689D
C114}	307-1014-01	B010100	B033288	ATTENUATOR,FXD:100X	80009	307-1014-01
C116}						
C114}						
C116}	307-1014-02	B033289		ATTENUATOR,FXD:100X	80009	307-1014-02
C124}	307-1013-01	B010100	B033288	ATTENUATOR,FXD:10X	80009	307-1013-01
C126}						
C124}						
C126}	307-1013-00	B033289		ATTENUATOR,FXD,:10X	80009	307-1013-00
C134	281-0182-00			CAP.,VAR,PLSTC:1.8-10PF,300V	34553	2222-809-05002
C136	281-0614-00			CAP.,FXD,CER DI:6800PF,+80-20%,500V	72982	302-000Y5U0682Z
C138	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C140	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C142	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C145	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	72982	811-546E103Z
C147	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	72982	811-546E103Z
C150	281-0605-00			CAP.,FXD,CER DI:200PF,10%,500V	72982	301-000Y5D0201K
C153	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C157	281-0605-00			CAP.,FXD,CER DI:200PF,10%,500V	72982	301-000Y5D0201K
C164	281-0523-00			CAP.,FXD,CER DI:100PF,+/-20PF,350V	72982	301-000U2M0101M
C170	281-0630-00			CAP.,FXD,CER DI:390PF,5%,500V	72982	301-000Y5D0391J
C176	281-0592-00			CAP.,FXD,CER DI:4.7PF,+/-0.5PF,500V	72982	301-023C0H0479D
C178	281-0564-00			CAP.,FXD,CER DI:24PF,5%,500V	72982	301-000C0G0240J
C183	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C185	281-0630-00			CAP.,FXD,CER DI:390PF,5%,500V	72982	301-000Y5D0391J
C189	281-0547-00	B010100	B010299	CAP.,FXD,CER DI:2.7PF,10%,500V	72982	301-000C0J0279C
C189	281-0547-00	B010300		CAP.,FXD,CER DI:2.7PF,(NOM VALUE),SEL	72982	301-000C0J0279C
C190	281-0623-00			CAP.,FXD,CER DI:650PF,5%,500V	72982	301-000Y5D0651J
C197	283-0094-00			CAP.,FXD,CER DI:27PF,10%,200V		
C198	281-0544-00			CAP.,FXD,CER DI:5.6PF,10%,500V	72982	301-000C0H0569D
C199	281-0153-00	B010100	B010299	CAP.,VAR,AIR DI:1.7-10PF,250V	74970	187-0106-005
C199	281-0166-00	B010300		CAP.,VAR,AIR DI:1.9-15.7PF,250V	74970	187-0109-005
C210	281-0623-00			CAP.,FXD,CER DI:650PF,5%,500V	72982	301-000Y5D0651J
C225	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C230	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	72982	811-546E103Z
C242	283-0094-00	B010100	B010337	CAP.,FXD,CER DI:27PF,10%,200V		
C242	281-0579-00	B010338	B019999	CAP.,FXD,CER DI:21PF,5%,500V	72982	301-050C0G0210J
C242	283-0094-00	B020000	B030969	CAP.,FXD,CER DI:27PF,10%,200V		
C242	281-0564-00	B030970		CAP.,FXD,CER DI:24PF,(NOM VALUE),SEL		
C247	283-0094-00	B010100	B010337	CAP.,FXD,CER DI:27PF,10%,200V		
C247	281-0579-00	B010338	B019999	CAP.,FXD,CER DI:21PF,5%,500V	72982	301-050C0G0210J
C247	283-0094-00	B020000	B030969	CAP.,FXD,CER DI:27PF,10%,200V		
C247	281-0564-00	B030970		CAP.,FXD,CER DI:24PF,(NOM VALUE),SEL		
C263	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C270	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C280	281-0600-00			CAP.,FXD,CER DI:35PF,10%,500V	72982	308-000C0G0350K
C300	283-0005-00			CAP.,FXD,CER DI:0.01UF,+100-0%,250V	72982	8131-250651103P
C301	285-0816-04			CAP.,FXD,PLSTC:0.19UF,10%,600V		
C302	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C312	281-0572-00			CAP.,FXD,CER DI:6.8PF,+/-0.5PF,500V	72982	301-000C0H0689D
C314 }	307-1014-01	B010100	B033288	ATTENUATOR,FXD:100X	80009	307-1014-01
C316 }						
C314 }	307-1014-02	B033289		ATTENUATOR,FXD:100X	80009	307-1014-02
C316 }						

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
C324 C326	307-1013-01	B010100	B033288	ATTENUATOR,FXD:10X	80009	307-1013-01
C324 C326	307-1013-00	B033289		ATTENUATOR,FXD:10X	80009	307-1013-00
C334	281-0182-00			CAP.,VAR,PLSTC:1.8-10PF,300V	34553	2222-809-05002
C336	281-0614-00			CAP.,FXD,CER DI:6800PF,+80-20%,500V	72982	302-000Y5U0682Z
C338	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C342	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C345	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C350	281-0605-00			CAP.,FXD,CER DI:200PF,10%,500V	72982	301-000Y5D0201K
C357	281-0605-00			CAP.,FXD,CER DI:200PF,10%,500V	72982	301-000Y5D0201K
C364	281-0523-00	B010100	B030969	CAP.,FXD,CER DI:100PF,+/-20PF,350V	72982	301-000U2M0101M
C364	281-0549-00	B030930		CAP.,FXD,CER DI:68PF,10%,500V		
C370	281-0630-00			CAP.,FXD,CER DI:390PF,5%,500V	72982	301-000Y5D0391J
C376	281-0592-00			CAP.,FXD,CER DI:4.7PF,+/-0.5PF,500V	72982	301-023C0H0479D
C378	281-0564-00			CAP.,FXD,CER DI:24PF,5%,500V	72982	301-000C0G0240J
C383	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C385	281-0630-00			CAP.,FXD,CER DI:390PF,5%,500V	72982	301-000Y5D0391J
C389	281-0547-00	B010100	B010299	CAP.,FXD,CER DI:2.7PF,10%,500V	72982	301-000C0J0279C
C389	281-0547-00	B010300		CAP.,FXD,CER DI:2.7PF,10%,500V	72982	301-000C0J0279C
C390	281-0623-00			CAP.,FXD,CER DI:650PF,5%,500V	72982	301-000Y5D0651J
C397	283-0094-00			CAP.,FXD,CER DI:27PF,10%,200V		
C399	281-0153-00	B010100	B010299	CAP.,VAR,AIR DI:1.7-10PF,250V	74970	187-0106-005
C399	281-0166-00	B010300		CAP.,VAR,AIR DI:1.9-15.7PF,250V	74970	187-0109-005
C410	281-0623-00			CAP.,FXD,CER DI:650PF,5%,500V	72982	301-000Y5D0651J
C425	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C463	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C480	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C485	283-0150-00			CAP.,FXD,CER DI:650PF,5%,200V	72982	835-515B651J
C490	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	72982	811-546E103Z
C493	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	72982	811-546E103Z
C494	290-0527-00			CAP.,FXD,ELCTLT:15UF,20%,20V	90201	TDC156M020FL
C495	290-0527-00			CAP.,FXD,ELCTLT:15UF,20%,20V	90201	TDC156M020FL
C496	290-0527-00			CAP.,FXD,ELCTLT:15UF,20%,20V	90201	TDC156M020FL
C497	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	72982	811-546E103Z
C498	290-0534-00			CAP.,FXD,ELCTLT:1UF,20%,35V	56289	196D105X0035HA1
C499	283-0002-00			CAP.,FXD,CER DI:0.01UF,+80-20%,500V	72982	811-546E103Z
C625	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C645	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C650	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C656	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C670	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
C680	283-0000-00			CAP.,FXD,CER DI:0.001UF,+100-0%,500V	72982	831-516E102P
CR138	152-0324-00	B010100	B029999	SEMICOND DEVICE:SILICON,35V,100MA	03508	SE416
CR138	152-0367-00	B030000		SEMICOND DEVICE:SILICON,20V,20PA	07263	FSA1540
CR140	152-0153-00			SEMICOND DEVICE:SILICON,15V,50MA	13715	FD7003
CR190	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR210	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR338	152-0324-00	B010100	B029999	SEMICOND DEVICE:SILICON,35V,100MA	03508	SE416
CR338	152-0367-00	B030000		SEMICOND DEVICE:SILICON,20V,20PA	07263	FSA1540
CR340	152-0153-00			SEMICOND DEVICE:SILICON,15V,50MA	13715	FD7003
CR390	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR395	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR410	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR415	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152
CR490	152-0141-02			SEMICOND DEVICE:SILICON,30V,150MA	07910	1N4152

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
CR491	152-0141-02			SEMICON D DEVICE:SILICON,30V,150MA	07910	1N4152
CR610	152-0141-02			SEMICON D DEVICE:SILICON,30V,150MA	07910	1N4152
CR630	152-0141-02			SEMICON D DEVICE:SILICON,30V,150MA	07910	1N4152
DS105	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
DS110	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
DS305	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
DS310	150-0111-00			LAMP,GLOW:NEON,1.2MA	08806	2AC-AT
J100	131-0679-00	B010100	B031398	CONNECTOR,RCPT,:BNC W/HARDWARE	24931	28JR168-1
J100	131-0679-02	B031399		CONNECTOR,RCPT,:BNC W/HARDWARE		
J300	131-0679-00	B010100	B031398	CONNECTOR,RCPT,:BNC W/HARDWARE	24931	28JR168-1
J300	131-0679-02	B031399		CONNECTOR,RCPT,:BNC W/HARDWARE		
K190	148-0034-00			RELAY,ARMATURE:DPDT,15VDC,600 OHM	80009	148-0034-00
K390	148-0034-00			RELAY,ARMATURE:DPDT,15VDC,600 OHM	80009	148-0034-00
L170	276-0507-00			SHIELDING BEAD,:0.6UH	78488	57-0180-7D
L185	276-0507-00			SHIELDING BEAD,:0.6UH	78488	57-0180-7D
L370	276-0507-00			SHIELDING BEAD,:0.6UH	78488	57-0180-7D
L385	276-0507-00			SHIELDING BEAD,:0.6UH	78488	57-0180-7D
L494	108-0245-00			COIL,RF:3.9UH	80009	108-0245-00
L496	108-0245-00			COIL,RF:3.9UH	80009	108-0245-00
Q105	151-0347-00			TRANSISTOR:SILICON,NPN	80009	151-0347-00
Q110	151-0347-00			TRANSISTOR:SILICON,NPN	80009	151-0347-00
Q140A,B	151-1032-00			TRANSISTOR:SILICON,FET,DUAL	17856	DN399
Q150	151-0333-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS918	80009	151-0333-00
Q155	151-0333-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS918	80009	151-0333-00
Q170 ¹	153-0603-00			SEMICON DVC SE:SILICON,NPN,MTCHD PAIR	80009	153-0603-00
Q172	151-0223-00			TRANSISTOR:SILICON,NPN	80009	151-0223-00
Q185 ¹	153-0603-00			SEMICON DVC SE:SILICON,NPN,MTCHD PAIR	80009	153-0603-00
Q187	151-0223-00			TRANSISTOR:SILICON,NPN	80009	151-0223-00
Q190 ²	153-0610-00			SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q195	151-0325-00			TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q210 ²	153-0610-00			SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q215	151-0325-00			TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q220	151-0341-00			TRANSISTOR:SILICON,NPN	07263	2N3565
Q230	151-0325-00			TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q235	151-0325-00			TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q240	151-0225-00	B010100	B010337	TRANSISTOR:SILICON,NPN	07910	CS23365
Q240	151-0333-00	B010338		TRANSISTOR:SILICON,NPN,SEL FROM MPS918	80009	151-0333-00
Q250	151-0225-00	B010100	B010337	TRANSISTOR:SILICON,NPN	07910	CS23365
Q260 ³	153-0610-00			SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q265 ³	153-0610-00			SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q270	151-0220-00			TRANSISTOR:SILICON,PNP	80009	151-0220-00
Q272	151-0341-00			TRANSISTOR:SILICON,NPN	07263	2N3565
Q275	151-0220-00			TRANSISTOR:SILICON,PNP	80009	151-0220-00
Q280	151-0325-00			TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q285	151-0325-00			TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q290	151-0325-00			TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q292	151-0221-00	B010100	B029999	TRANSISTOR:SILICON,PNP	07263	S24849
Q292	151-0220-00	B030000		TRANSISTOR:SILICON,PNP	80009	151-0220-00
Q305	151-0347-00			TRANSISTOR:SILICON,NPN	80009	151-0347-00
Q310	151-0347-00			TRANSISTOR:SILICON,NPN	80009	151-0347-00
Q340A,B	151-1032-00			TRANSISTOR:SILICON,FET,DUAL	17856	DN399
Q350	151-0333-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS918	80009	151-0333-00
Q355	151-0333-00			TRANSISTOR:SILICON,NPN,SEL FROM MPS918	80009	151-0333-00

- ¹ Q170 and Q185 furnished as a matched pair.
- ² Q190 and Q210 furnished as a matched pair.
- ³ Q260 and Q265 furnished as a matched pair.

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
Q370 ¹	153-0603-00		SEMICON DVC SE:SILICON,NPN,MTCHD PAIR	80009	153-0603-00
Q372	151-0223-00		TRANSISTOR:SILICON,NPN	80009	151-0223-00
Q385 ¹	153-0603-00		SEMICON DVC SE:SILICON,NPN,MTCHD PAIR	80009	153-0603-00
Q387	151-0223-00		TRANSISTOR:SILICON,NPN	80009	151-0223-00
Q390 ²	153-0610-00		SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q395	151-0325-00		TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q410 ²	153-0610-00		SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q415	151-0325-00		TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q420	151-0341-00		TRANSISTOR:SILICON,NPN	07263	2N3565
Q430	151-0325-00		TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q435	151-0325-00		TRANSISTOR:SILICON,PNP,SEL FROM 2N4258	80009	151-0325-00
Q460 ³	153-0610-00		SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q465 ³	153-0610-00		SEMICON DVC SE:SILICON,PNP,MTCHD PAIR	80009	153-0610-00
Q480	151-0341-00		TRANSISTOR:SILICON,NPN	07263	2N3565
Q485	151-0341-00		TRANSISTOR:SILICON,NPN	07263	2N3565
Q610	151-0254-00		TRANSISTOR:SILICON,NPN	03508	2N5308
Q630	151-0254-00		TRANSISTOR:SILICON,NPN	03508	2N5308
R101	316-0105-00		RES.,FXD,COMP:1M OHM,10%,0.25W	01121	CB1051
R102	321-0222-00		RES.,FXD,FILM:2K OHM,1%,0.125W	75042	CEAT0-2001F
R103	316-0104-00		RES.,FXD,COMP:100K OHM,10%,0.25W	01121	CB1041
R105	316-0105-00		RES.,FXD,COMP:1M OHM,10%,0.25W	01121	CB1051
R107	315-0134-00		RES.,FXD,COMP:130K OHM,5%,0.25W	01121	CB1345
R109	316-0105-00		RES.,FXD,COMP:1M OHM,10%,0.25W	01121	CB1051
R112	315-0560-00		RES.,FXD,COMP:56 OHM,5%,0.25W	01121	CB5605
R132	322-0481-01		RES.,FXD,FILM:1M OHM,0.5%,0.25W	75042	CEBT0-1004D
R134	317-0100-00		RES.,FXD,COMP:10 OHM,5%,0.125W	01121	BB1005
R136	315-0474-00		RES.,FXD,COMP:470K OHM,5%,0.25W	01121	CB4745
R138	316-0102-00		RES.,FXD,COMP:1K OHM,10%,0.25W	01121	CB1021
R140	315-0621-00		RES.,FXD,COMP:620 OHM,5%,0.25W	01121	CB6215
R142	322-0268-00		RES.,FXD,FILM:6.04K OHM,1%,0.25W	75042	CEBT0-6041F
R143	322-0268-00		RES.,FXD,FILM:6.04K OHM,1%,0.25W	75042	CEBT0-6041F
R145	311-0546-00		RES.,VAR,NONWIR:10K OHM,20%,0.75W	97979	TK0546G
R147	321-0353-00		RES.,FXD,FILM:46.4K OHM,1%,0.125W	75042	CEAT0-4642F
R148	321-0138-00		RES.,FXD,FILM:267 OHM,1%,0.125W	75042	CEAT0-2670F
R150	315-0621-00		RES.,FXD,COMP:620 OHM,5%,0.25W	01121	CB6215
R151	315-0471-00		RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R152	311-1564-00		RES.,VAR,NONWIR:500 OHM,20%,0.50W	73138	91A-500ROM
R153	315-0302-00		RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R155	315-0302-00		RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R157	315-0621-00		RES.,FXD,COMP:620 OHM,5%,0.25W	01121	CB6215
R158	321-0078-00		RES.,FXD,FILM:63.4 OHM,1%,0.125W	75042	CEAT0-63R40F
R159	321-0114-03		RES.,FXD,FILM:150 OHM,0.25%,0.125W	91637	MFF1816D150R0C
R161	321-0085-03		RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF186D75R00C
R163	321-0085-03		RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF186D75R00C
R164	321-0033-00		RES.,FXD,FILM:21.5 OHM,1%,0.125W	75042	CEAT0-21R50F
R166	315-0560-00		RES.,FXD,COMP:56 OHM,5%,0.25W	01121	CB5605
R168 ⁴	311-1364-00		RES.,VAR,NONWIR:1K OHM,10%,0.50W	01121	10M321A
R169	321-0068-00		RES.,FXD,FILM:49.9 OHM,1%,0.125W	75042	CEAT0-49R90F
R170	315-0431-00		RES.,FXD,COMP:430 OHM,5%,0.25W	01121	CB4315
R172	321-0170-00		RES.,FXD,FILM:576 OHM,1%,0.125W	75042	CEAT0-5760F
R173	316-0101-00		RES.,FXD,COMP:100 OHM,10%,0.25W	01121	CB1011
R176	315-0512-00		RES.,FXD,COMP:5.1K OHM,5%,0.25W	01121	CB5125
R178	315-0331-00		RES.,FXD,COMP:330 OHM,5%,0.25W	01121	CB3315
R179	321-0067-00		RES.,FXD,FILM:48.7 OHM,1%,0.125W	75042	CEAT0-48R70F

¹Q370 and Q385 furnished as a matched pair.

²Q390 and Q410 furnished as a matched pair.

³Q460 and Q465 furnished as a matched pair.

⁴Furnished as a unit with S168.

Electrical Parts List—5A48

Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
R181	323-0245-00			RES.,FXD,FILM:3.48K OHM,1%,0.50W	75042	CECT0-3481F
R182	311-1565-00			RES.,VAR,NONWIR:250 OHM,20%,0.50W	73138	91A250ROM
R183	323-0245-00			RES.,FXD,FILM:3.48K OHM,1%,0.50W	75042	CECT0-3481F
R185	315-0431-00			RES.,FXD,COMP:430 OHM,5%,0.25W	01121	CB4315
R187	321-0170-00			RES.,FXD,FILM:576 OHM,1%,0.125W	75042	CEAT0-5760F
R189	321-0135-00			RES.,FXD,FILM:249 OHM,1%,0.125W	75042	CEAT0-2490F
R190	315-0271-00			RES.,FXD,COMP:270 OHM,5%,0.25W	01121	CB2715
R195	322-0193-00			RES.,FXD,FILM:1K OHM,1%,0.25W	75042	CEBT0-1001F
R197	315-0332-00			RES.,FXD,COMP:3.3K OHM,5%,0.25W	01121	CB3325
R199	315-0390-00			RES.,FXD,COMP:39 OHM,5%,0.25W	01121	CB3905
R200	323-0189-00			RES.,FXD,FILM:909 OHM,1%,0.50W	75042	CECT0-9090F
R201	321-0065-00			RES.,FXD,FILM:46.4 OHM,1%,0.125W	75042	CEAT0-46R40F
R202	321-0065-00			RES.,FXD,FILM:46.4 OHM,1%,0.125W	75042	CEAT0-46R40F
R205	311-1566-00			RES.,VAR,NONWIR:200 OHM,20%,0.50W	73138	91A-200ROM
R206	321-0126-00	B010100	B030969	RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEAT0-2000F
R206	321-0121-00	B030970		RES.,FXD,FILM:178 OHM,1%,0.125W		
R210	315-0271-00			RES.,FXD,COMP:270 OHM,5%,0.25W	01121	CB2715
R215	322-0193-00			RES.,FXD,FILM:1K OHM,1%,0.25W	75042	CEBT0-1001F
R217	315-0201-00			RES.,FXD,COMP:200 OHM,5%,0.25W	01121	CB2015
R220	321-0246-00			RES.,FXD,FILM:3.57K OHM,1%,0.125W	75042	CEAT0-3571F
R222	315-0202-00	B010100	B010299	RES.,FXD,COMP:2K OHM,5%,0.25W	01121	CB2025
R222	315-0162-00	B010300		RES.,FXD,COMP:1.6K OHM,5%,0.25W	01121	CB1625
R225	311-0546-00			RES.,VAR,NONWIR:10K OHM,20%,0.75W	97979	TK0546G
R227	315-0202-00	B010100	B010299	RES.,FXD,COMP:2K OHM,5%,0.25W	01121	CB2025
R227	315-0162-00	B010300		RES.,FXD,COMP:1.6K OHM,5%,0.25W	01121	CB1625
R230	321-0118-00			RES.,FXD,FILM:165 OHM,1%,0.125W	75042	CEAT0-1650F
R232	315-0201-00			RES.,FXD,COMP:200 OHM,5%,0.25W	01121	CB2015
R235	321-0118-00			RES.,FXD,FILM:165 OHM,1%,0.125W	75042	CEAT0-1650F
R240	316-0100-00			RES.,FXD,COMP:10 OHM,10%,0.25W	01121	CB1001
R242	321-0060-00	B010100	B010337	RES.,FXD,FILM:41.2 OHM,1%,0.125W	75042	CEAT0-41R20F
R242	321-0064-00	B010338	B019999	RES.,FXD,FILM:45.3 OHM,1%,0.125W	75042	CEAT0-45R30F
R242	321-0060-00	B020000		RES.,FXD,FILM:41.2 OHM,1%,0.125W	75042	CEAT0-41R20F
R243	315-0182-00			RES.,FXD,COMP:1.8K OHM,5%,0.25W	01121	CB1825
R245	315-0182-00			RES.,FXD,COMP:1.8K OHM,5%,0.25W	01121	CB1825
R247	321-0060-00	B010100	B010337	RES.,FXD,FILM:41.2 OHM,1%,0.125W	75042	CEAT0-41R20F
R247	321-0064-00	B010338	B019999	RES.,FXD,FILM:45.3 OHM,1%,0.125W	75042	CEAT0-45R30F
R247	321-0060-00	B020000		RES.,FXD,FILM:41.2 OHM,1%,0.125W	75042	CEAT0-41R20F
R260	315-0221-00			RES.,FXD,COMP:220 OHM,5%,0.25W	01121	CB2215
R262	321-0055-00			RES.,FXD,FILM:36.5 OHM,1%,0.125W	75042	CEAT0-36R50F
R263	322-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.25W	75042	CEBT0-1501F
R265	321-0055-00			RES.,FXD,FILM:36.5 OHM,1%,0.125W	75042	CEAT0-36R50F
R267	315-0221-00			RES.,FXD,COMP:220 OHM,5%,0.25W	01121	CB2215
R270	321-0119-00			RES.,FXD,FILM:169 OHM,1%,0.125W	75042	CEAT0-1690F
R272	315-0301-00			RES.,FXD,COMP:300 OHM,5%,0.25W	01121	CB3015
R274	315-0431-00			RES.,FXD,COMP:430 OHM,5%,0.25W	01121	CB4315
R276	321-0119-00			RES.,FXD,FILM:169 OHM,1%,0.125W	75042	CEAT0-1690F
R278	315-0820-00			RES.,FXD,COMP:82 OHM,5%,0.25W	01121	CB8205
R280	321-0058-00			RES.,FXD,FILM:39.2 OHM,1%,0.125W	75042	CEAT0-39R20F
R281	321-0157-00			RES.,FXD,FILM:422 OHM,1%,0.125W	75042	CEAT0-4220F
R284	321-0146-00			RES.,FXD,FILM:324 OHM,1%,0.125W	75042	CEAT0-3240F
R285	321-0225-00			RES.,FXD,FILM:2.15K OHM,1%,0.125W	75042	CEAT0-2151F
R290	321-0058-00			RES.,FXD,FILM:39.2 OHM,1%,0.125W	75042	CEAT0-39R20F
R291	316-0101-00			RES.,FXD,COMP:100 OHM,10%,0.25W	01121	CB1011
R292	321-0146-00			RES.,FXD,FILM:324 OHM,1%,0.125W	75042	CEAT0-3240F
R296	323-0198-00			RES.,FXD,FILM:1.13K OHM,1%,0.50W		

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Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Dscont	Name & Description	Mfr Code	Mfr Part Number
R301	316-0105-00			RES.,FXD,COMP:1M OHM,10%,0.25W	01121	CB1051
R302	321-0222-00			RES.,FXD,FILM:2K OHM,1%,0.125W	75042	CEAT0-2001F
R303	316-0104-00			RES.,FXD,COMP:100K OHM,10%,0.25W	01121	CB1041
R305	316-0105-00			RES.,FXD,COMP:1M OHM,10%,0.25W	01121	CB1051
R307	315-0134-00			RES.,FXD,COMP:130K OHM,5%,0.25W	01121	CB1345
R309	316-0105-00			RES.,FXD,COMP:1M OHM,10%,0.25W	01121	CB1051
R312	315-0620-00			RES.,FXD,COMP:62 OHM,5%,0.25W	01121	CB6205
R332	322-0481-01			RES.,FXD,FILM:1M OHM,0.5%,0.25W	75042	CEBT0-1004D
R334	317-0100-00			RES.,FXD,COMP:10 OHM,5%,0.125W	01121	BB1005
R336	315-0474-00			RES.,FXD,COMP:470K OHM,5%,0.25W	01121	CB4745
R338	316-0102-00			RES.,FXD,COMP:1K OHM,10%,0.25W	01121	CB1021
R340	315-0621-00			RES.,FXD,COMP:620 OHM,5%,0.25W	01121	CB6215
R342	322-0268-00			RES.,FXD,FILM:6.04K OHM,1%,0.25W	75042	CEBT0-6041F
R343	322-0268-00			RES.,FXD,FILM:6.04K OHM,1%,0.25W	75042	CEBT0-6041F
R345	311-0546-00			RES.,VAR,NONWIR:10K OHM,20%,0.75W	97979	TK0546G
R347	321-0353-00			RES.,FXD,FILM:46.4K OHM,1%,0.125W	75042	CEAT0-4642F
R348	321-0138-00			RES.,FXD,FILM:267 OHM,1%,0.125W	75042	CEAT0-2670F
R350	315-0621-00			RES.,FXD,COMP:620 OHM,5%,0.25W	01121	CB6215
R351	315-0471-00			RES.,FXD,COMP:470 OHM,5%,0.25W	01121	CB4715
R352	311-1564-00			RES.,VAR,NONWIR:500 OHM,20%,0.50W	73138	91A-500ROM
R353	315-0302-00			RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R355	315-0302-00			RES.,FXD,COMP:3K OHM,5%,0.25W	01121	CB3025
R357	315-0621-00			RES.,FXD,COMP:620 OHM,5%,0.25W	01121	CB6215
R358	321-0078-00			RES.,FXD,FILM:63.4 OHM,1%,0.125W	75042	CEAT0-63R40F
R359	321-0114-03			RES.,FXD,FILM:150 OHM,0.25%,0.125W	91637	MFF1816D150R0C
R361	321-0085-03			RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF186D75R00C
R363	321-0085-03			RES.,FXD,FILM:75 OHM,1%,0.125W	91637	MFF186D75R00C
R364	321-0033-00			RES.,FXD,FILM:21.5 OHM,1%,0.125W	75042	CEAT0-21R50F
R366	315-0560-00			RES.,FXD,COMP:56 OHM,5%,0.25W	01121	CB5605
R368 ¹	311-1364-00			RES.,VAR,NONWIR:1K OHM,10%,0.50W	01121	10M321A
R369	321-0068-00			RES.,FXD,FILM:49.9 OHM,1%,0.125W	75042	CEAT0-49R90F
R370	315-0431-00			RES.,FXD,COMP:430 OHM,5%,0.25W	01121	CB4315
R372	321-0170-00			RES.,FXD,FILM:576 OHM,1%,0.125W	75042	CEAT0-5760F
R373	316-0101-00			RES.,FXD,COMP:100 OHM,10%,0.25W	01121	CB1011
R376	315-0512-00			RES.,FXD,COMP:5.1K OHM,5%,0.25W	01121	CB5125
R378	315-0331-00			RES.,FXD,COMP:330 OHM,5%,0.25W	01121	CB3315
R379	321-0067-00			RES.,FXD,FILM:48.7 OHM,1%,0.125W	75042	CEAT0-48R70F
R381	323-0245-00			RES.,FXD,FILM:3.48K OHM,1%,0.50W	75042	CECT0-3481F
R382	311-1565-00			RES.,VAR,NONWIR:250 OHM,20%,0.50W	73138	91A250ROM
R383	323-0245-00			RES.,FXD,FILM:3.48K OHM,1%,0.50W	75042	CECT0-3481F
R385	315-0431-00			RES.,FXD,COMP:430 OHM,5%,0.25W	01121	CB4315
R387	321-0170-00			RES.,FXD,FILM:576 OHM,1%,0.125W	75042	CEAT0-5760F
R389	321-0135-00			RES.,FXD,FILM:249 OHM,1%,0.125W	75042	CEAT0-2490F
R390	315-0271-00			RES.,FXD,COMP:270 OHM,5%,0.25W	01121	CB2715
R392	316-0220-00			RES.,FXD,COMP:22 OHM,10%,0.25W	01121	CB2201
R395	315-0201-00			RES.,FXD,COMP:200 OHM,5%,0.25W	01121	CB2015
R397	315-0332-00			RES.,FXD,COMP:3.3K OHM,5%,0.25W	01121	CB3325
R399	315-0390-00			RES.,FXD,COMP:39 OHM,5%,0.25W	01121	CB3905
R400	323-0189-00			RES.,FXD,FILM:909 OHM,1%,0.50W	75042	CECT0-9090F
R401	321-0065-00			RES.,FXD,FILM:46.4 OHM,1%,0.125W	75042	CEAT0-46R40F
R402	321-0065-00			RES.,FXD,FILM:46.4 OHM,1%,0.125W	75042	CEAT0-46R40F
R405	311-1566-00			RES.,VAR,NONWIR:200 OHM,20%,0.50W	73138	91A-200ROM
R406	321-0126-00	B010100	B030969	RES.,FXD,FILM:200 OHM,1%,0.125W	75042	CEAT0-2000F
R406	321-0121-00	B030970		RES.,FXD,FILM:178 OHM,1%,0.125W	75042	CEAT0-1780F
R410	315-0271-00			RES.,FXD,COMP:270 OHM,5%,0.25W	01121	CB2715

¹Furnished as aunit with S368.

Electrical Parts List—5A48

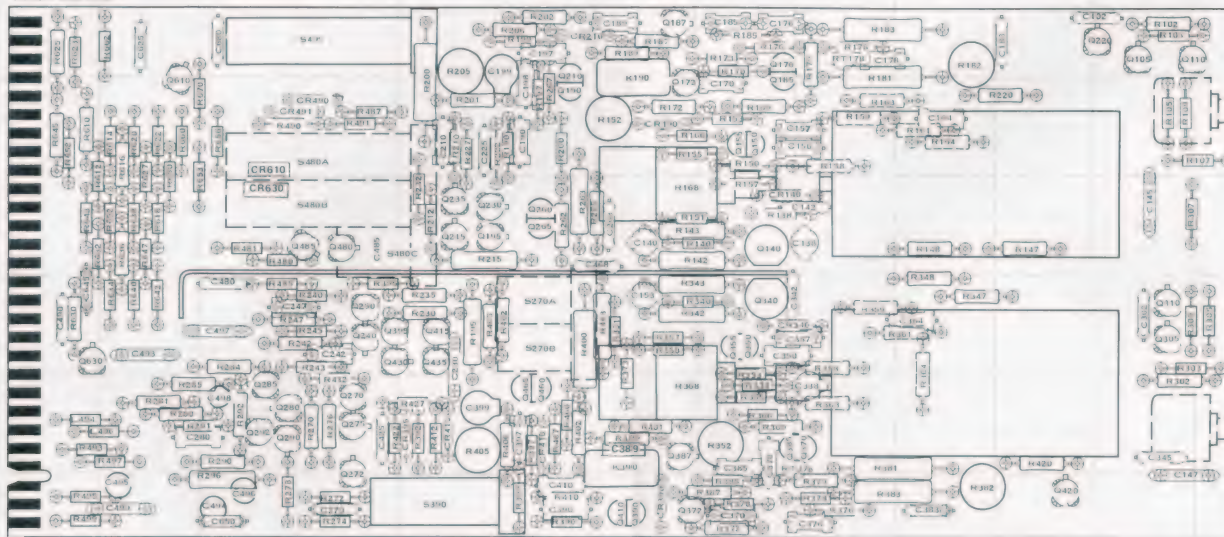
Ckt No.	Tektronix Part No.	Serial/Model No. Eff	Discont	Name & Description	Mfr Code	Mfr Part Number
R412	316-0220-00			RES.,FXD,COMP:22 OHM,10%,0.25W	01121	CB2201
R420	321-0246-00			RES.,FXD,FILM:3.57K OHM,1%,0.125W	75042	CEAT0-3571F
R422	315-0202-00	B010100	B010299	RES.,FXD,COMP:2K OHM,5%,0.25W	01121	CB2025
R422	315-0162-00	B010300		RES.,FXD,COMP:1.6K OHM,5%,0.25W	01121	CB1625
R425	311-0546-00			RES.,VAR,NONWIR:10K OHM,20%,0.75W	97979	TK0546G
R427	315-0202-00	B010100	B010299	RES.,FXD,COMP:2K OHM,5%,0.25W	01121	CB2025
R427	315-0162-00	B010300		RES.,FXD,COMP:1.6K OHM,5%,0.25W	01121	CB1625
R432	315-0201-00			RES.,FXD,COMP:200 OHM,5%,0.25W	01121	CB2015
R460	315-0221-00			RES.,FXD,COMP:220 OHM,5%,0.25W	01121	CB2215
R462	321-0055-00			RES.,FXD,FILM:36.5 OHM,1%,0.125W	75042	CEAT0-36R50F
R463	322-0210-00			RES.,FXD,FILM:1.5K OHM,1%,0.25W	75042	CEBT0-1501F
R465	321-0055-00			RES.,FXD,FILM:36.5 OHM,1%,0.125W	75042	CEAT0-36R50F
R467	315-0221-00			RES.,FXD,COMP:220 OHM,5%,0.25W	01121	CB2215
R480	315-0331-00			RES.,FXD,COMP:330 OHM,5%,0.25W	01121	CB3315
R481	316-0101-00			RES.,FXD,COMP:100 OHM,10%,0.25W	01121	CB1011
R485	315-0331-00			RES.,FXD,COMP:330 OHM,5%,0.25W	01121	CB3315
R487	315-0682-00			RES.,FXD,COMP:6.8K OHM,5%,0.25W	01121	CB6825
R490	315-0133-00			RES.,FXD,COMP:13K OHM,5%,0.25W	01121	CB1335
R491	315-0623-00			RES.,FXD,COMP:62K OHM,5%,0.25W	01121	CB6235
R493	307-0103-00			RES.,FXD,COMP:2.7 OHM,5%,0.25W	01121	CB27G5
R495	307-0103-00			RES.,FXD,COMP:2.7 OHM,5%,0.25W	01121	CB27G5
R497	307-0103-00			RES.,FXD,COMP:2.7 OHM,5%,0.25W	01121	CB27G5
R499	315-0103-00			RES.,FXD,COMP:10K OHM,5%,0.25W	01121	CB1035
R610	321-0299-00			RES.,FXD,FILM:12.7K OHM,1%,0.125W	75042	CEAT0-1272F
R612	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R614	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R616	321-0344-00			RES.,FXD,FILM:37.4K OHM,1%,0.125W	75042	CEAT0-3742F
R618	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R620	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R622	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R623	315-0513-00			RES.,FXD,COMP:51K OHM,5%,0.25W	01121	CB5135
R625	321-0344-00			RES.,FXD,FILM:37.4K OHM,1%,0.125W	75042	CEAT0-3742F
R627	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R630	321-0299-00			RES.,FXD,FILM:12.7K OHM,1%,0.125W	75042	CEAT0-1272F
R632	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R634	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R636	321-0344-00			RES.,FXD,FILM:37.4K OHM,1%,0.125W	75042	CEAT0-3742F
R638	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R640	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R642	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R643	315-0513-00			RES.,FXD,COMP:51K OHM,5%,0.25W	01121	CB5135
R645	321-0344-00			RES.,FXD,FILM:37.4K OHM,1%,0.125W	75042	CEAT0-3742F
R647	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R650	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R652	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R653	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R656	315-0123-00			RES.,FXD,COMP:12K OHM,5%,0.25W	01121	CB1235
R658	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R660	315-0753-00			RES.,FXD,COMP:75K OHM,5%,0.25W	01121	CB7535
R662	315-0154-00			RES.,FXD,COMP:150K OHM,5%,0.25W	01121	CB1545
R670	315-0123-00			RES.,FXD,COMP:12K OHM,5%,0.25W	01121	CB1235
RT178	307-0125-00			RES.,THERMAL:500 OHM,10%,25 DEG C	50157	2D1595
RT378	307-0125-00			RES.,THERMAL:500 OHM,10%,25 DEG C	50157	2D1595

Electrical Parts List—5A48

Ckt No.	Tektronix Part No.	Serial/Model No. Eff Dscont	Name & Description	Mfr Code	Mfr Part Number
S100A } S100B }	260-1353-01		SWITCH,PUSH:CH1 AC PRE		
S125 S168 ¹	263-1000-00		SWITCH,PUSH:CH1 CHG GND		
S270A }	260-1365-00		ACTR ASSY,CAM S:CH1 VOLTS/DIV CAL		
S270B }			SWITCH,PUSH:CH1 TRIG		
S300A } S300B }	260-1353-01		SWITCH,PUSH:CH2 TRIG		
S325 S368 ²	263-1000-00		SWITCH,PUSH:CH2 AC PRE		
			SWITCH,PUSH:CH2 CHG GND		
			ACTR ASSY,CAM S:CH 2 VOLTS/DIV CAL		
S390 S480A }	260-1209-00		SWITCH,PUSH:CH2 INVERT	71590	2KAB001000-358
S480B }	260-1364-00		SWITCH,PUSH:CH1 MODE		
S480C }			SWITCH,PUSH:CH2 MODE		
S495	260-1363-00		SWITCH,PUSH:ADD MODE		
			SWITCH,PUSH:DISPLAY ON		

¹Furnished as a unit with R168.
²Furnished as a unit with R368.

PARTS LOCATION GRID

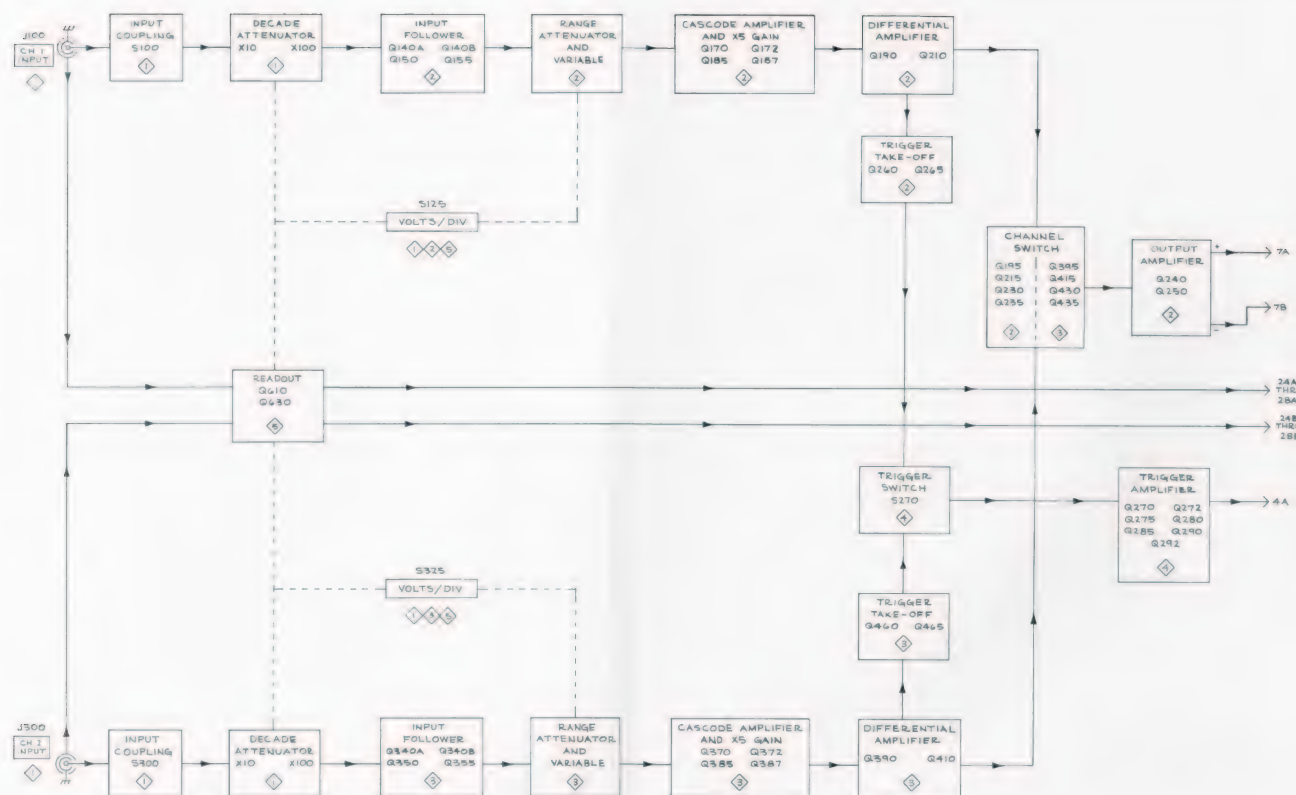


NOTE: COMPONENTS SHOWN WITH DASHED LINES ARE LOCATED ON BACK SIDE OF BOARD.

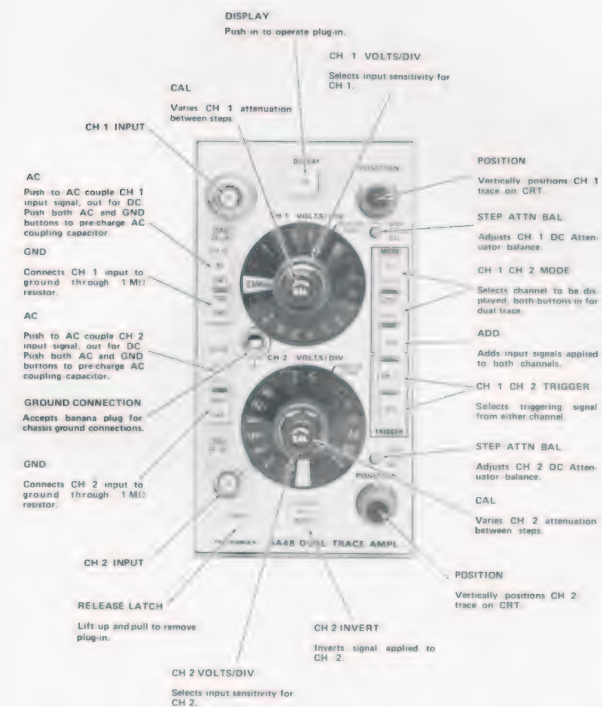


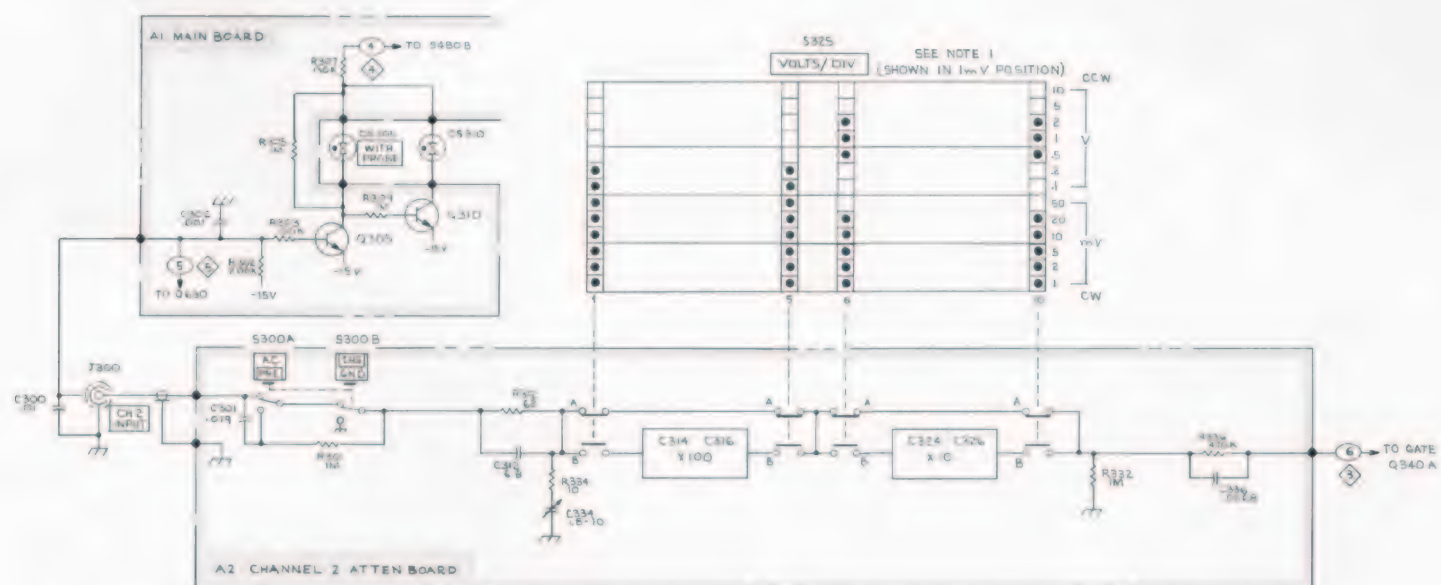
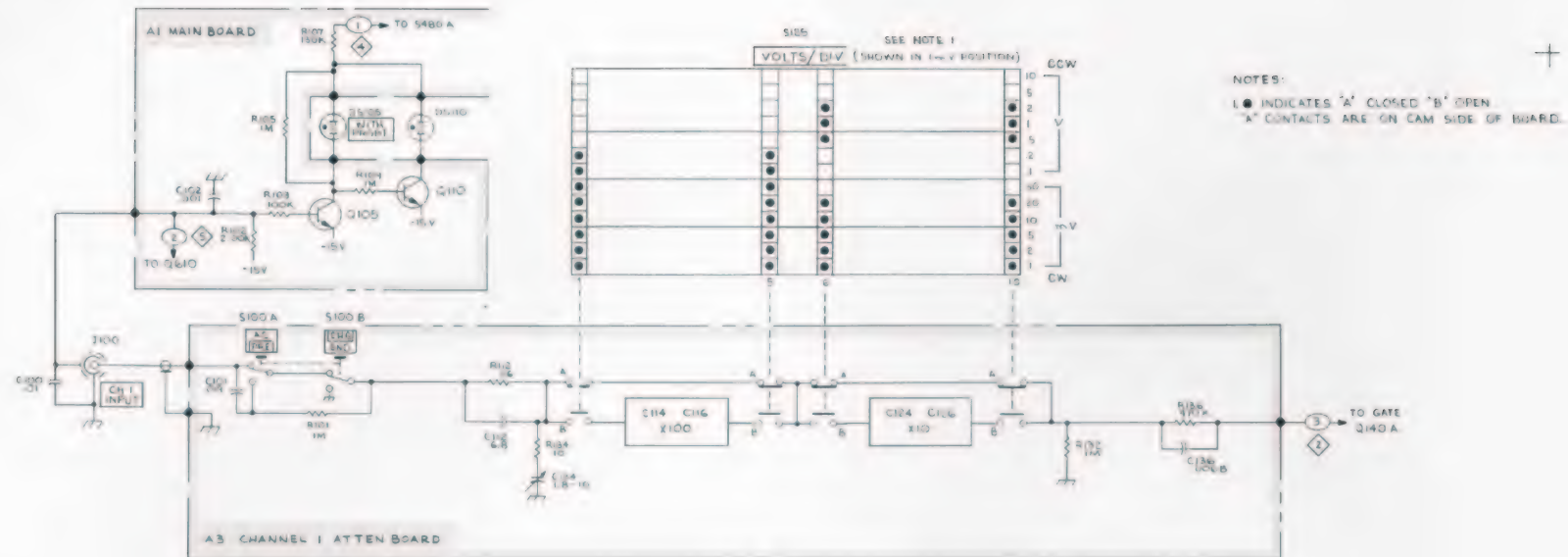
CKT	GRID CKT	GRID
LOC	LOC	LOC
R276	D5	R420 K5
R277	D6	R422 D1
R280 B5	R427	D5
R281 B5	R432	E6
R284 C4	R460	F5
R285	R462	F4
R290 C5	R463	G4
R292 C5	R465	E4
R296 C6	R467	F4
R300 C6	R480	C3
R302 L5	R481	C3
R303 L4	R482	D2
R306 A4	R487	D2
R307 L3	R490	C2
R309 L4	R491	D2
R312 D5	R495	A6
R312 C5	R496	A6
R334 C6	R499	A6
R336	R505	A6
R338	R512	A3
R340 H4	R514	B2
R342 G4	R515	B2
R343	R518	B3
R347 J4	R520	B2
R348 J4	R522	B2
R350 G4	R623	A1
R361 G4	R625	A1
R362 H5	R627	B3
R365	R630	B3
R366	R632	A3
R367 G4	R634	B4
R368 H4	R636	B4
R369 H5	R638	B4
R371 J4	R640	B4
R363 J5	R642	B4
R364 J5	R645	A2
R366	R647	B3
R368 H5	R650	B3
R369 H5	R652	B3
R370 H6	R653	C3
R372	R656	C2
R373 G4	R658	C2
R376 I6	R660	B2
R378 I6	R672	B1
R379 I6	R679	B1
R381 I5	R670	C2
R382 J6	RT178	I1
R383	RT1378	I5
R385		
R387 H6		
R389 G5		
R390 F6		
R392 E5	S100A	Q2
R395 D4	S100B	Q2
R397 F6	S220	F4
R399 F6	S270B	F4
R400 F4	S300A	F5
R401 E5	S300B	F5
R402 F5	S300	F4
R405 E5	S480A	D2
R406 E5	S480B	D3
R410	S480C	D3
R412 E5	S485	D1

[illegible]



CONTROLS AND CONNECTORS







Mechanical Parts List—5A48

FIGURE 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
1-87	214-0579-00			4	.	TERM.,	TEST PT:	0.40	INCH	LONG	80009	214-0579-00
-88	337-1656-00			1	.	SHLD,	ELECTRICAL:	CH1/CH2				
-89	348-0031-00			1	.	GROMMET,	PLASTIC:	0.156	INCH	DIA	80009	348-0031-00
-90	376-0051-01			2	.	CPLG,	SHAFT,	FLEX:	FOR	0.125 INCH	80009	376-0051-01
	213-0022-00			4	.	SETSCREW:	4-40	X	0.188	INCH,HEX SOC STL	74445	OBD
	354-0251-00			2	.	RING,	COUPLING:	0.251	ID X	0.375 INCH OD,AL	80009	354-0251-00
	376-0049-00			1	.	CPLG,	SHAFT,	FLEX:	PLASTIC		80009	376-0049-00
-91	-----			2	.	RES.,	VAR:	(SEE	R168,	R368 EPL)		
	361-0515-00	XB031673		2	.	SPACER,	SWITCH:	PLASTIC			80009	361-0515-00
-92	260-1209-00			1	.	SWITCH,	PUSH:	4PDT			71590	2KAB001000-358
-93	260-1363-00			1	.	SWITCH,	PUSH:	DISPLAY-ON				
-94	260-1364-00			1	.	SWITCH,	PUSH:	MODE				
-95	260-1365-00			1	.	SWITCH,	PUSH:	TRIG SOURCE				
-96	361-0382-00			4	.	SPACER,	PB SW:	BROWN,	0.275	INCH LONG	80009	361-0382-00
-97	361-0384-00			9	.	SPACER,	PB SW:	0.133	INCH LONG		80009	361-0384-00
						(ATTACHING PARTS FOR CKT BD)						
-98	213-0146-00			4	SCR,	TPG,	THD	FOR:	6-20	X 0.313 INCH,PNH STL	83385	OBD
	210-0801-01			4	WASHER,	FLAT:	0.140	ID X	0.281" OD,STL		12327	NOTE
						- - - * - - -						
-99	131-1372-00			2	CONTACT,	ELEC:					80009	131-1372-00
-100	426-0724-02			1	FR SECT,	PLUG-IN:	BOTTOM				80009	426-0724-02
-101	426-0725-02			1	FR SECT,	PLUG-IN:	TOP				80009	426-0725-02
-102	175-0825-00			FT	WIRE,	ELECTRICAL:	2	WIRE	RIBBON,	2.9 FT LONG	23499	TEK-175-0825-00
-103	175-0830-00			FT	WIRE,	ELECTRICAL:	7	WIRE	RIBBON,	1.6 FT LONG	08261	TEK-175-0830-00

Mechanical Parts List—5A48**CROSS INDEX MFR. CODE NUMBER TO MANUFACTURER**

MFR.CODE	MANUFACTURER	ADDRESS	CITY,STATE,ZIP
00779	AMP, Inc.	P. O. Box 3608	Harrisburg, PA 17105
05820	Wakefield Engineering, Inc.	Audubon Road	Wakefield, MA 01880
08261	Spectra-Strip Corp.	7100 Lampson Ave.	Garden Grove, CA 92642
12327	Freeway Corp.	9301 Allen Dr.	Cleveland, OH 44125
22526	Berg Electronics, Inc.	Youk Expressway	New Cumberland, PA 17070
23499	Gavitt Wire and Cable, Division of RSC Industries, Inc.	455 N. Quince St.	Escondido, CA 92025
24931	Specialty Connector Co., Inc.	3560 Madison Ave.	Indianapolis, IN 46227
42838	National Rivet and Mfg. Co.	1-21 East Jefferson St.	Waupun, WI 53963
45722	USM Corp., Parker-Kalon Fastener Div.	1 Peekay Drive	Clifton, NJ 07014
71590	Centralab Electronics, Div. of Globe-Union, Inc.	5757 N. Green Bay Ave.	Milwaukee, WI 53201
71785	TRW Electronic Components, Cinch Connector Operations	1501 Morse Ave.	Elk Grove Village, IL 60007
73743	Fischer Special Mfg. Co.	446 Morgan St.	Cincinnati, OH 45206
74445	Holo-Krome Co.	31 Brook St. West	Hartford, CT 06110
78189	Illinois Tool Works, Inc. Shakeproof Division	St. Charles Road	Elgin, IL 60120
78471	Tilley Mfg. Co.	900 Industrial Rd.	San Carlos, CA 94070
79807	Wrought Washer Mfg. Co.	2100 S. O Bay St.	Milwaukee, WI 53207
80009	Tektronix, Inc.	P. O. Box 500	Beaverton, OR 97077
83385	Central Screw Co.	2530 Crescent Dr.	Broadview, IL 60153
97464	Industrial Retaining Ring Co.	57 Cordier St.	Irvington, NJ 07111

Mechanical Parts List—5A48

FIGURE 1 EXPLODED

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Dscont	Qty	1 2 3 4 5	Name & Description	Mfr Code	Mfr Part Number
1-1	337-1399-00			2		SHLD,ELECTRICAL:SIDE	80009	337-1399-00
-2	366-0494-00			2		KNOB:GRAY WITH SETSCREW	80009	366-0494-00
	213-0153-00			1		. SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-3	366-1317-00			2		KNOB:RED WITH SETSCREW	80009	366-1317-00
	213-0153-00			1		. SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-4	366-1400-00			2		KNOB:CH1 & CH2 VOLTS/DIV	80009	366-1400-00
	213-0153-00			1		. SETSCREW:5-40 X 0.125 INCH,HEX SOC STL	74445	OBD
-5	366-1286-02			1		KNOB:LATCH	80009	366-1286-02
						(ATTACHING PARTS)		
-6	214-1840-00			1		PIN,KNOB SECRG:	80009	214-1840-00
						- - - * - - -		
-7	366-1257-11			2		PUSH BUTTON:GRAY--AC PRE	80009	366-1257-11
-8	366-1257-12			2		PUSH BUTTON:GRAY--CHG GND	80009	366-1257-12
-9	366-1257-14			1		PUSH BUTTON:GRAY--ON	80009	366-1257-14
-10	366-1257-32			1		PUSH BUTTON:GRAY--INVERT	80009	366-1257-32
-11	366-1257-17			1		PUSH BUTTON:GRAY--CH1 DUAL	80009	366-1257-17
-12	366-1257-18			1		PUSH BUTTON:GRAY--TRACE CH2	80009	366-1257-18
-13	366-1257-16			1		PUSH BUTTON:GRAY--ADD	80009	366-1257-16
-14	366-1257-19			1		PUSH BUTTON:GRAY--CH1	80009	366-1257-19
-15	366-1257-20			1		PUSH BUTTON:CH2	80009	366-1257-20
-16	426-0681-00			11		FR,PUSH BUTTON:GRAY PLASTIC	80009	426-0681-00
-17	131-0679-00	B010100	B031398	2		CONNECTOR,RCPT,:BNC W/HARDWARE	24931	28Jr168-1
	131-0679-02	B031399		2		CONNECTOR,RCPT,:BNC W/HARDWARE		
						(ATTACHING PARTS FOR EACH)		
	220-0497-00	XB031399		1		NUT,PLAIN,HEX.:		
	210-1039-00	XB031399		1		WASHER,LOCK:INT,0.521 ID X 0.625 INCH OD,STL		
						- - - * - - -		
-18	358-0029-00			2		BSHG,MACH.THD:HEX,0.375-32 X 0.438"LONG	80009	358-0029-00
						(ATTACHING PARTS FOR EACH)		
-19	210-0590-00			1		NUT,PLAIN,HEX.:0.375 X 0.438INCH,STL	73743	2X28269-402
-20	210-0978-00			1		WASHER,FLAT:0.375 ID X 0.50 INCH OD,STL	78471	OBD
						- - - * - - -		
-21	-----			2		RES.,VAR:POSITION(SEE R225,R425 EPL)		
						(ATTACHING PARTS)		
-22	210-0583-00			1		NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20319-402
-23	210-0940-00			1		WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL	79807	OBD
						- - - * - - -		
-24	131-1204-00			1		JACK,TIP:GROUNDING	80009	131-1204-00
						(ATTACHING PARTS)		
-25	210-0583-00			1		NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	73743	2X20319-402
-26	210-0046-00			1		WASHER,LOCK:INTL,0.26 ID X 0.40" OD,STL	78189	1214-05-00-0541C
						- - - * - - -		
-27	333-1573-00			1		PANEL,FRONT:	80009	333-1573-00
-28	358-0378-00			2		BUSHING,SLEEVE:PRESS MOUNT	80009	358-0378-00
-29	214-1513-01			1		LCH,PLUG-IN RET:	80009	214-1513-01
						(ATTACHING PARTS)		
-30	213-0254-00			1		SCR,TPG,THD CTG:2-56X0.25"100 DEG,FLH STL	45722	OBD
						- - - * - - -		
-31	337-1430-00			4		SHIELD,LIGHT:		
-32	136-0429-00			4		LIGHT INDICATOR:		
-33	386-1916-00			1		SUBPANEL,FRONT:	80009	386-1916-00
						(ATTACHING PARTS)		
-34	213-0229-00			4		SCR,TPG,THD FOR:6-20X0.375 100 DEG,FLH STL	83385	OBD
						- - - * - - -		
-35	337-1398-00			1		SHLD,ELECTRICAL:REAR		
-36	344-0195-01			2		CLIP,ELECTRICAL:GROUNDING		
-37	384-1059-00			4		EXTENSION SHAFT:6.58 INCH LONG	80009	384-1059-00
-38	384-1100-00			1		EXTENSION SHAFT:0.13 SQ X 6.215" LONG,PLSTC	80009	384-1100-00
-39	384-1129-00			2		EXTENSION SHAFT:5.607 INCH LONG	80009	384-1129-00
-40	384-1138-00			2		EXTENSION SHAFT:0.124 DIA X 5.15INCH LONG	80009	384-1138-00
-41	337-1663-00			1		SHLD,ELECTRICAL:ATTEN CH-1		
						(ATTACHING PARTS)		
-42	213-0088-00			3		SCR,TPG,THD CTG:4-24 X0.25 INCH,PNH STL	83385	OBD
						- - - * - - -		

Mechanical Parts List—5A48

FIGURE 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number
1-43	-----	-----		1						CKT BOARD ASSY:ATTEN CH 1(SEE A3 EPL)	80009	131-1030-00
-44	131-1030-00 ¹			4						. CONTACT ASSY,EL:CAM SWITCH,BOTTOM	80009	131-1031-00
	131-1031-00 ¹			4						. CONTACT ASSY,EL:CAM SWITCH, TOP	42838	RA-29952715
-45	210-0779-00			4						. RIVET,TUBULAR:0.051 OD X 0.115 INCH LONG		
-46	131-1338-00			2						. CONTACT,ELEC:GROUNDING (ATTACHING PARTS)	42838	RA-29952715
-47	210-0779-00			3						. RIVET,TUBULAR:0.051 OD X 0.115 INCH LONG - - - * - - -	00779	1-332095-2
-48	136-0252-01			12						. CONTACT,ELEC:0.178 INCH LONG		
-49	337-1737-00			1						. SHLD,ELECTRICAL:	80009	361-0382-00
-50	260-1353-01			1						. SWITCH,PUSH:		
-51	361-0382-00			4						. SPACER,PB SW:BROWN,0.275 INCH LONG (ATTACHING PARTS FOR CKT BD)	83385	OBD
-52	407-1435-00			1						BRACKET,ANGLE:		
-53	211-0116-00			5						SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS - - - * - - -	83385	OBD
-54	337-1664-00			1						SHLD,ELECTRICAL:ATTEN CH-2 (ATTACHING PARTS)	83385	OBD
-55	213-0088-00			3						SCR,TPG,THD CTG:4-24 X0.25 INCH,PNH STL - - - * - - -		
-56	-----	-----		1						CKT BOARD ASSY:ATTEN CH 2(SEE A2 EPL)	80009	131-1030-00
-57	131-1030-00			4						. CONTACT ASSY,EL:CAM SWITCH,BOTTOM	80009	131-1031-00
	131-1031-00			4						. CONTACT ASSY,EL:CAM SWITCH, TOP	42838	RA-29952715
-58	210-0779-00			4						. RIVET,TUBULAR:0.051 OD X 0.115 INCH LONG		
-59	131-1338-00			2						. CONTACT,ELEC:GROUNDING (ATTACHING PARTS FOR EACH)	42838	RA-29952715
-60	210-0779-00			3						. RIVET,TUBULAR:0.051 OD X 0.115 INCH LONG - - - * - - -	00779	1-332095-2
-61	136-0252-01			12						. CONTACT,ELEC:0.178 INCH LONG		
-62	337-1737-00			1						. SHLD,ELECTRICAL:	80009	361-0382-00
-63	260-1353-01			1						. SWITCH,PUSH:AC,GND		
-64	361-0382-00			4						. SPACER,PB SW:BROWN,0.275 INCH LONG (ATTACHING PARTS FOR CKT BD)	83385	OBD
-65	407-1096-00			1						BRACKET,ANGLE:		
-66	211-0116-00			5						SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS - - - * - - -	80009	263-1000-00
	263-1000-00			2						ACTR ASSY,CAM SW:	80009	401-0115-00
-67	401-0115-00			1						. BEARING,CAM SW:CENTER	97464	3100-43-CD
-68	354-0391-00			1						. RING,RETAINING:0.395"FREE ID X 0.025" STL		
-69	105-0341-00			1						. DRUM,CAM SW:	80009	214-1139-03
-70	214-1139-03			2						. SPRING,FLAT:RED COLORED	80009	214-1127-00
-71	214-1127-00			2						. ROLLER,DETENT:0.125 DIA X 0.125 INCH L	80009	131-0963-00
-72	131-0963-00			1						. CONTACT,ELEC:GROUNDING	80009	401-0081-00
-73	401-0081-00			1						. BEARING,CAM SW:FRONT	73743	2X12161-402
-74	210-0406-00			7						. NUT,PLAIN,HEX.:4-40 X 0.188 INCH,BRS (ATTACHING PARTS)	83385	OBD
-75	211-0116-00			8						SCR,ASSEM WSHR:4-40 X 0.312 INCH,PNH BRS - - - * - - -		
-76	-----	-----		1						CKT BOARD ASSY:MAIN(SEE A1 EPL)	80009	131-1030-00
-77	131-1030-00			10						. CONTACT ASSY,EL:CAM SWITCH,BOTTOM	80009	131-1031-00
	131-1031-00			18						. CONTACT ASSY,EL:CAM SWITCH, TOP	42838	RA-29952715
-78	210-0779-00			18						. RIVET,TUBULAR:0.051 OD X 0.115 INCH LONG	71785	133-96-12-062
-79	136-0235-00			2						. SOCKET,PLUG-IN:6 CONTACT,ROUND	22526	75060
-80	136-0252-04	B010100 B030999		16						. CONTACT,ELEC:0.188 INCH LONG		
	136-0337-00	B031000		2						. SOCKET,PLUG-IN:8 PIN		
	-----	-----		6						. TRANSISTORS:MATCHED PAIR		
	-----	-----		-						. . EACH PAIR INCLUDES:	05820	256-D
-81	214-1916-00			1						. . HEAT SINK,ELEC:TEMPERATURE STABILIZING	80009	214-0973-00
-82	214-0973-00			2						. HEAT SINK,ELEC:0.28 X 0.18 OVAL X 0.187"H		
-83	-----	-----		2						. RES.,VAR:(SEE R145,R345 EPL) (ATTACHING PARTS FOR EACH)	73743	2X20319-402
-84	210-0583-00			1						. NUT,PLAIN,HEX.:0.25-32 X 0.312 INCH,BRS	79807	OBD
-85	210-0940-00			1						. WASHER,FLAT:0.25 ID X 0.375 INCH OD,STL		
-86	387-0794-00			1						. BRKT,VAR RES: - - - * - - -		

¹For repair information-SEE SERVICE SECTION OF 5403 MANUAL.

Mechanical Parts List—5A48

FIGURE 1 EXPLODED (CONT)

Fig. & Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Dscont	Qty	1	2	3	4	5	Name & Description	Mfr Code	Mfr Part Number		
1-87	214-0579-00			4	.	TERM.,	TEST PT:	0.40	INCH	LONG	80009	214-0579-00		
-88	337-1656-00			1	.	SHLD,	ELECTRICAL:	CH1/CH2						
-89	348-0031-00			1	.	GROMMET,	PLASTIC:	0.156	INCH	DIA	80009	348-0031-00		
-90	376-0051-01			2	.	CPLG,	SHAFT,	FLEX:	FOR	0.125	INCH	80009	376-0051-01	
	213-0022-00			4	.	SETScrew:	4-40	X	0.188	INCH,HEX SOC STL	74445	OBD		
	354-0251-00			2	.	RING,	COUPLING:	0.251	ID X	0.375	INCH OD,AL	80009	354-0251-00	
	376-0049-00			1	.	CPLG,	SHAFT,	FLEX:	PLASTIC		80009	376-0049-00		
-91	-----			2	.	RES.,	VAR:	(SEE	R168,	R368	EPL)			
	361-0515-00	XB031673		2	.	SPACER,	SWITCH:	PLASTIC			80009	361-0515-00		
-92	260-1209-00			1	.	SWITCH,	PUSH:	4PDT			71590	2KAB001000-358		
-93	260-1363-00			1	.	SWITCH,	PUSH:	DISPLAY-ON						
-94	260-1364-00			1	.	SWITCH,	PUSH:	MODE						
-95	260-1365-00			1	.	SWITCH,	PUSH:	TRIG SOURCE						
-96	361-0382-00			4	.	SPACER,	PB	SW:	BROWN,	0.275	INCH	LONG	80009	361-0382-00
-97	361-0384-00			9	.	SPACER,	PB	SW:	0.133	INCH	LONG	80009	361-0384-00	
						(ATTACHING	PARTS	FOR	CKT	BD)				
-98	213-0146-00			4	SCR,	TPG,	THD	FOR:	6-20	X	0.313	INCH,PNH STL	83385	OBD
	210-0801-01			4	WASHER,	FLAT:	0.140	ID X	0.281"	OD,STL	12327	NOTE		
						- - - *	- - -							
-99	131-1372-00			2	CONTACT,	ELEC:					80009	131-1372-00		
-100	426-0724-02			1	FR	SECT,	PLUG-IN:	BOTTOM			80009	426-0724-02		
-101	426-0725-02			1	FR	SECT,	PLUG-IN:	TOP			80009	426-0725-02		
-102	175-0825-00			FT	WIRE,	ELECTRICAL:	2	WIRE	RIBBON,	2.9	FT	LONG	23499	TEK-175-0825-00
-103	175-0830-00			FT	WIRE,	ELECTRICAL:	7	WIRE	RIBBON,	1.6	FT	LONG	08261	TEK-175-0830-00

